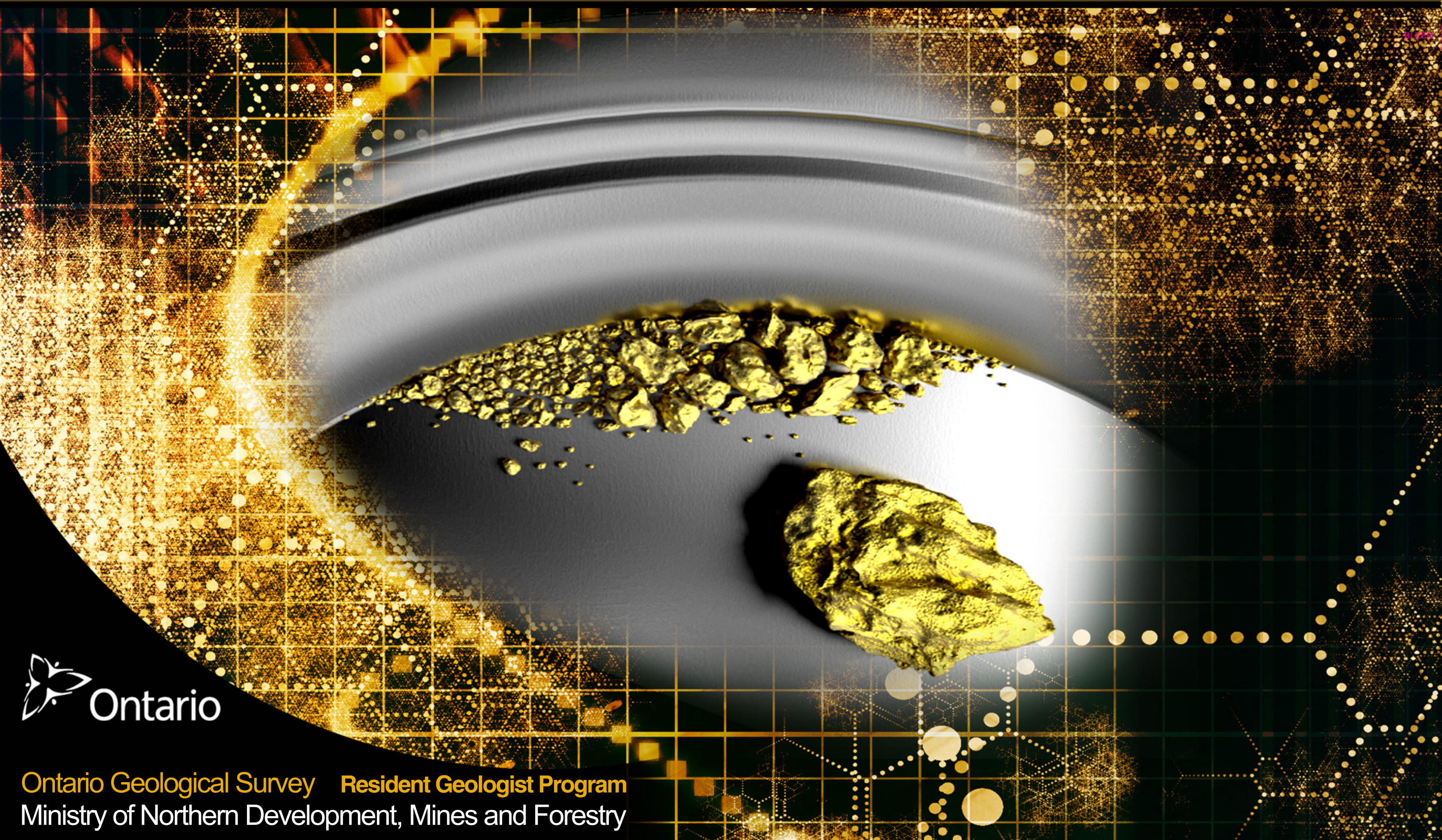
Explore the Opportunities...

search

RECOMMENDATIONS *for* Exploration 2010-2011



Ontario

Ontario Geological Survey   **Resident Geologist Program**

Ministry of Northern Development, Mines and Forestry

ONTARIO CANADA

Recommendations for Exploration

2010-2011

General Area that is Recommended for Mineral Exploration

ONTARIO
CANADA

Photo courtesy of Karen Labonte

The Ontario Resident Geologist Program

The role of the Ontario Geological Survey's Resident Geologist Program is to monitor, stimulate and facilitate mineral exploration and support the sustainable development and stewardship of Ontario's mineral resources. The program is provincial in scope, forms the primary client service component of the Ontario Geological Survey and operates with a staff complement of 42 through a network of 9 field offices strategically located across the province. Six Regional Resident Geologists, supported by 10 District Geologists, 8 District Geological Assistants, 2 Mineral Deposit Compilation Geologists and 3 GIS/Data Specialists provide a variety of services to mineral industry clients as well as functions internal to government that support the mineral resource sector. The Program's Land Use Policy and Planning Co-ordinator and 3 Regional Land Use Geologists provide input into land use planning issues in support of the mineral exploration industry. A First Nations Minerals Information officer, based in Thunder Bay, provides education, information, advice and expertise regarding geology, mineral exploration and mining to First Nation Communities throughout Ontario generally, and northern Ontario particularly.

Program services and functions are grouped into the following 7 key areas:

- **Provide expert geological consultation and advisory services to promote and stimulate mineral exploration and support the development and stewardship of Ontario's mineral resources in an environmentally responsible manner**
- **Generate and transfer new geoscientific data and ideas**
- **Maintain and provide public access to geoscience databases/other resource materials**
- **Monitor and report on mineral exploration and development activity**
- **Provide input into land use planning issues and initiatives to support the stewardship of Ontario's mineral resources**
- **Foster relationships amongst government, the mineral sector and Aboriginal communities**
- **Participate in marketing forums to promote Ontario's mineral endowment and attract mineral resource investment to the province**

The Resident Geologist Program also provides support to MNDMF's Mining Lands Section front-counter client services. The Senior Manager for the Resident Geologist Program is Jim Ireland, who is resident in Sudbury.

Jim Ireland
Senior Manager
Resident Geologist Program
Mines and Minerals Division

Ministry of Northern Development, Mines and Forestry
Ontario Geological Survey
Resident Geologist Program
B7004, 933 Ramsey Lake Road
Sudbury, Ontario P3E 6B5
Tel. 705-670-5955 Fax: 705-670-5905
E-mail: jim.ireland@ontario.ca

Ontario

For additional information on the Resident Geologist Program and the Ontario Geological Survey please log on to:
http://www.ontario.ca/residentgeologist

Published February 2011

HIGHLIGHTS

- **The two most prolific and well known gold related structures are the Porcupine-Destor (PDFZ) and Larder Lake-Cadillac (LLCB) faults.**
- **Many gold occurrences are also associated with splay faults or structures that emanate in various directions from these breaks. The Pipestone, Munro, Arrow, Ghostmount and McKenna faults are some of the more important PDFZ splays, while the Kirkland Lake, Upper Canada and Benson Creek faults are associated with the LLCB.**
- **The structural data shown on 1:100 000 scale OGS compilation maps (Figures 1a to 4a) illustrates the parabolic nature of selected portions of these "breaks".**
- **Superimposing the structures extracted from the PDFZ in Figure 1b onto the LLCB (Figure 2b) shows a remarkable similarity. For example, the Arrow Fault, a northeast-trending (0700) structure crossing the PDFZ, falls directly over the Upper Canada fault.**
- **This can also be shown for the LLCB west of Matachewan (Figure 3b) and the Casa Berardi break in the Burntbush area north of Lake Abitibi (Figure 4b).**

Contact:
Gary Grabowski
gary.grabowski@ontario.ca
(705) 568-4517 Ph.

Gold Structures in the Kirkland Lake District

The relationship between major structures and gold deposits in the Abitibi greenstone belt has been well documented and studied over the last century. The two most prolific and well known "breaks" (also referred to as fault zones or deformation zones) are the Porcupine-Destor (PDFZ) and Larder Lake-Cadillac (LLCB). Trending in a general east-west direction for more than 450 km through the south-central portion of the Abitibi greenstone belt, these two "breaks" have accounted for more than 65% of the historical gold production in Canada or more than 140 million ounces (>4000 tonnes) worth about C$160 billion (based on C$1150 per ounce). Major mining camps include Timmins, Kirkland Lake, Larder Lake, and Matachewan in Ontario as well as Val d'Or, Malartic and Rouyn-Noranda in Quebec. Many gold occurrences are also associated with splay faults or structures that emanate in various directions from these breaks. The Pipestone, Munro, Arrow, Ghostmount and McKenna faults are some of the more important PDFZ splays, while the Kirkland Lake, Upper Canada and Benson Creek faults are associated with the LLCB.

A Recommendation for Exploration was published in the 2003 Report of Activities (Meyer et al. 2004) speculating on the location of the LLCB west of Matachewan based on published magnetic surveys. The parabolic nature of portions of these "breaks" and the gold occurrences associated with them were discussed. Similarly, using the structural data shown on 1:100 000 scale OGS compilation maps, the parabolic nature of portions of these "breaks" is also evident. The PDFZ illustrated on OGS map P3398 (Figure 1a), exhibits this parabolic character from Beatty Township east to Garrison Township for a distance of about 30km. The major faults and cross structures are highlighted on Figure 1b. Note the relationship of gold occurrences with the cross structures to the PDFZ.

The LLCB on OGS map P3425 (Figure 2a) follows a similar shape from Lebel Township to McGarry Township for a distance of about 30 km. Superimposing the structures extracted from the PDFZ in Figure 1b onto the LLCB shows a remarkable similarity. For example, the Arrow Fault, a northeast-trending (0700) structure crossing the PDFZ, falls directly over the Upper Canada fault. The Upper Canada mine on this fault produced more than one million ounces of gold and is being actively explored by Queenston Mining Inc. The Upper Beaver property, also being explored by Queenston Mining Inc., falls on the intersection of the "Munro Fault" with a northeast-trending structure that crosses the LLCB at Queenston Mining Inc.'s McBean mine. Note also the number of gold showings on the cross faults as well.

The LLCB has been confidently traced as far west as Matachewan and the past-producing Young Davidson and Matachewan Consolidated mines, where it becomes covered by Proterozoic Huronian Supergroup sedimentary rocks. Traditionally, from Matachewan, the break is considered to follow a southwest trace toward Midlothian Township, or farther south toward Shining Tree. The magnetic pattern suggests that there is a similar parabolic trace of the LLCB, which would bring the break in a northwest direction toward Hincks Township (Meyer et al. 2004). Superimposing the structures from Figure 1b on to OGS map P3527 (Figures 3a and 3b) provides a similar pattern, when combined with magnetic data. Some minor "rubber sheeting" is required; however, the similarity is striking. There are more than twelve gold showings along this trend, the most important being the Ashley Mine in

Gold Structures in the Kirkland Lake District …cont'd

Bannockburn Township. The location of the "Arrow Fault" coincides with a structure in northern Bannockburn Township.

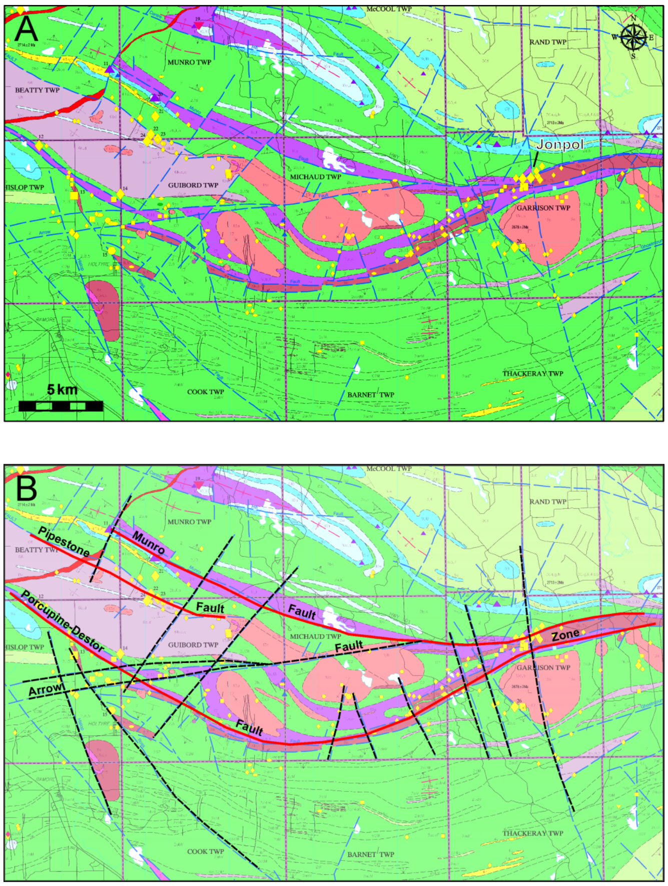


Figure 1. OGS map P3398 (after Ayer et al. 1999) showing major structures and gold occurrences south of the Lake Abitibi area (1a). PDFZ structures from 1a have been highlighted in 1b. Yellow point symbols represent gold occurrences.

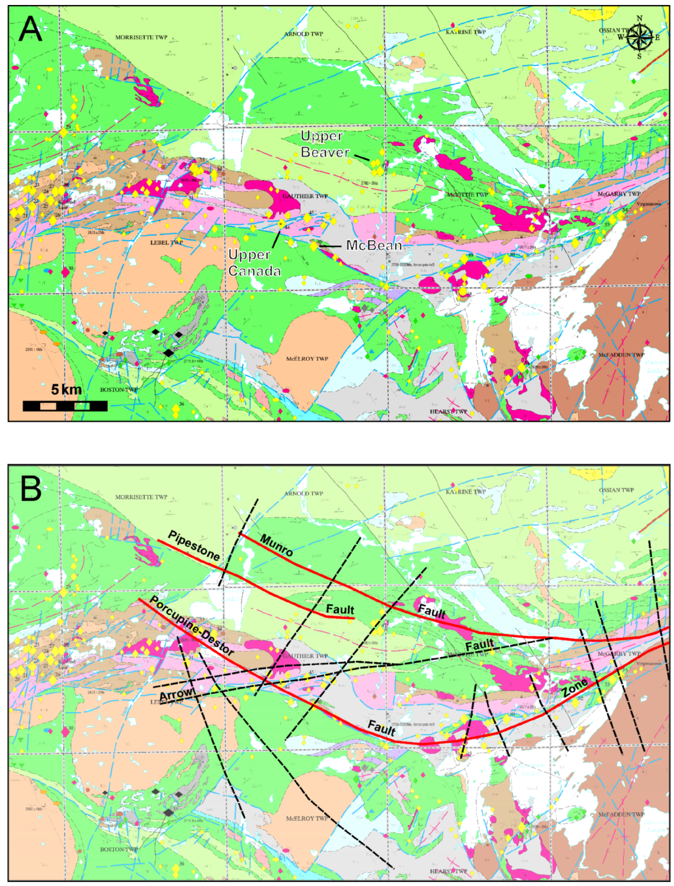


Figure 2. OGS map P3425 (after Ayer and Trowell 2000) showing major structures and gold occurrences in the Kirkland Lake area (1a). PDFZ structures from Figure 1a have been superimposed.

In October 2008, a high sensitivity airborne magnetic survey was released for the Burntbush area north of Lake Abitibi. The northern part of the Burntbush survey area hosts the westerly extension of the Casa Berardi tectonic zone, fault or break. A Recommendation for Exploration was published in the 2008 Report of Activities (Grabowski et al. 2009) highlighted the similar splay structures which could be seen in the magnetic pattern of the Burntbush survey. The western portion of the Burntbush area, shown on Figure 4a, is taken from OGS map P3609, which was published in April 2009. Once again, the structures captured from the PDFZ from Figure 1b can be aligned with the Casa Berardi break through Blakelock and Tweed townships (Figure 4b). Outcrop is very sparse in the area and geological interpretation depends greatly on diamond drill records and geophysical surveys. Consequently, mineral occurrences are based on drill hole data. Exploration efforts in the Burntbush area, using intersecting structures based on those found within the PDFZ and LLCB, should be carried out within this relatively unexplored area.

Gold Structures in the Kirkland Lake District …cont'd

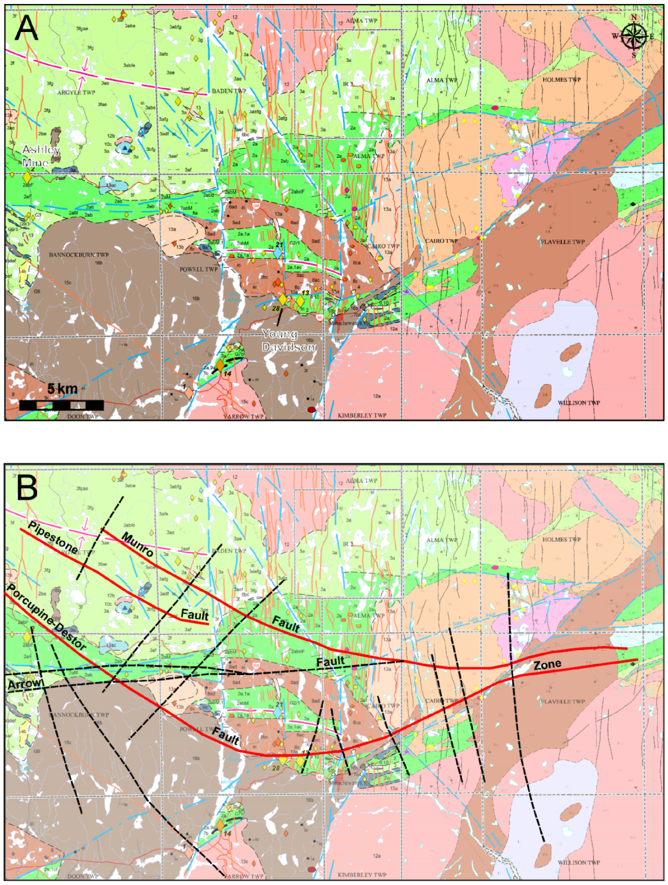


Figure 3. OGS map P3527 (after Ayer et al. 2003) showing major structures and gold occurrences in the Matachewan area (3a). PDFZ structures from Figure 1b have been superimposed in 3b. Yellow point symbols represent gold occurrences in 2b. Yellow point symbols represent gold occurrences.

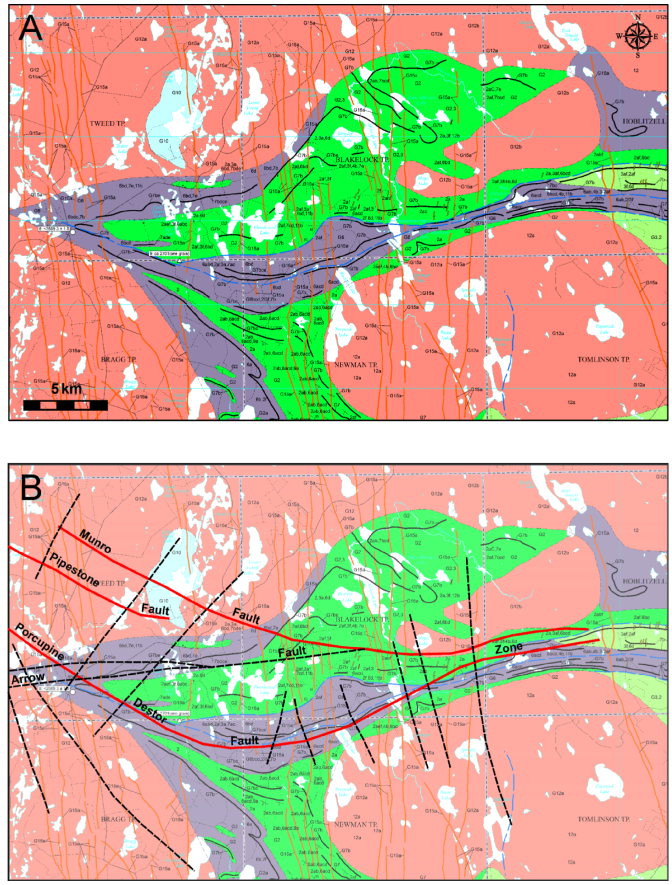


Figure 4. OGS map P3609 (after Ayer et al. 2009) showing major structures and gold occurrences in the Burntbush area (4a). PDFZ structures from Figure 1b have been superimposed in 4b.

Ayer, J.A. and Trowell, N.F. 2000. Geological Compilation of the Kirkland Lake Area, Abitibi Greenstone Belt; Ontario Geological Survey, Preliminary Map 3425, scale 1:100 000.

Ayer, J.A., Berger, B.R. and Trowell, N.F. 1999. Geological Compilation of the Lake Abitibi Area, Abitibi Greenstone Belt; Ontario Geological Survey, Preliminary Map 3398, scale 1:100 000.

Ayer, J.A., Trowell, N.F., Josey, S., Nevills, M. and Valade, L. 2003. Geological Compilation of the Matachewan Area, Abitibi Greenstone Belt; Ontario Geological Survey, Preliminary Map 3527, scale 1:100 000.

Ayer, J.A., Chartrand, J.E., Duget, M., Rainsford, D.R.B. and Trowell, N.F. 2009b. Geological compilation of the Burntbush-Detour lakes area, Abitibi greenstone belt. Ontario Geological Survey, Preliminary Map P.3609, scale 1:100 000.

Gold Structures in the Kirkland Lake District …cont'd

Grabowski, G.P.B., Guindon, D.L., Wilson, A.C. and Francoeur, M.C.M. 2009. Report of Activites 2008, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Kirkland Lake District; Ontario Geological Survey, Open File 6236, 45p.

Meyer, G., Cosec, M., Grabowski, G.P.B., Guindon, D.L., Chaloux, E.C. and Charette, M. 2000. Report of Activities 1999, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Kirkland Lake-Sudbury Districts; Ontario Geological Survey, Open File Report 6007, 88p.

Meyer, G., Grabowski, G.P.B., Guindon, D.L. and Chaloux, E. 2004. Report of Activities 2003, Resident Geologist Program, Kirkland Lake Regional Resident Geologist Report: Kirkland Lake and Sudbury Districts; Ontario Geological Survey, Open File Report 6131, 52p.

HIGHLIGHTS

- **Gold potential along Kirkland Lake Break extension through the Blake River**
- **Rocmec-1 deposit in Quebec has NI 43-101 resources**
- **Limited gold exploration in the Ontario side of the Blake River assemblage**

Contact:
David Guindon
dave.guindon@ontario.ca
(705) 568-4518 Ph.
Gary Grabowski
gary.grabowski@ontario.ca
(705) 568-4517 Ph.

Gold Deposits in the Blake River Assemblage

The Upper Blake River assemblage in Ontario has long been considered a prospective exploration target for volcanogenic massive sulphide deposits, similar to the Noranda camp of Québec. Recent mapping (Ross et al. 2009) suggests the base metal potential of the Blake River in Ontario to be less prospective. The majority of the Upper Blake River assemblage is often considered too distant from the Larder Lake–Cadillac Fault Zone (or Break) or the Destor–Porcupine Fault Zone to host economic gold deposits. An exception may be the Rocmec-1 (Russian Kid) deposit located north of Labyrinth Lake, just across the Québec border.

The deposit is hosted in a northeast-trending differentiated sill. The sill has several lithological facies including gabbro, diorite, quartz-diorite, granodiorite and tonalite. The mineralization is found within quartz-carbonate veining within subparallel shear zones. The orientation of the veins is 070° to 090° with 55° to 80° south dips. Veins are dislocated by up to 30m by transverse faults. Mineralization in the veins is limited to 2 to 10% pyrite with occasional chalcopyrite and visible gold (Duplessis and Dupéré 2007). A recent NI 43-101 technical report estimates mineral resources, using a 3 g/t gold cut-off as follows: measured mineral resource of 91 600 t @ 6.72 g/t Au, indicated mineral resource of 274 200 t @ 6.37 g/t Au and an inferred mineral resource of 955 200 t @ 10.37 g/t Au (Duplessis and Dupéré 2007).

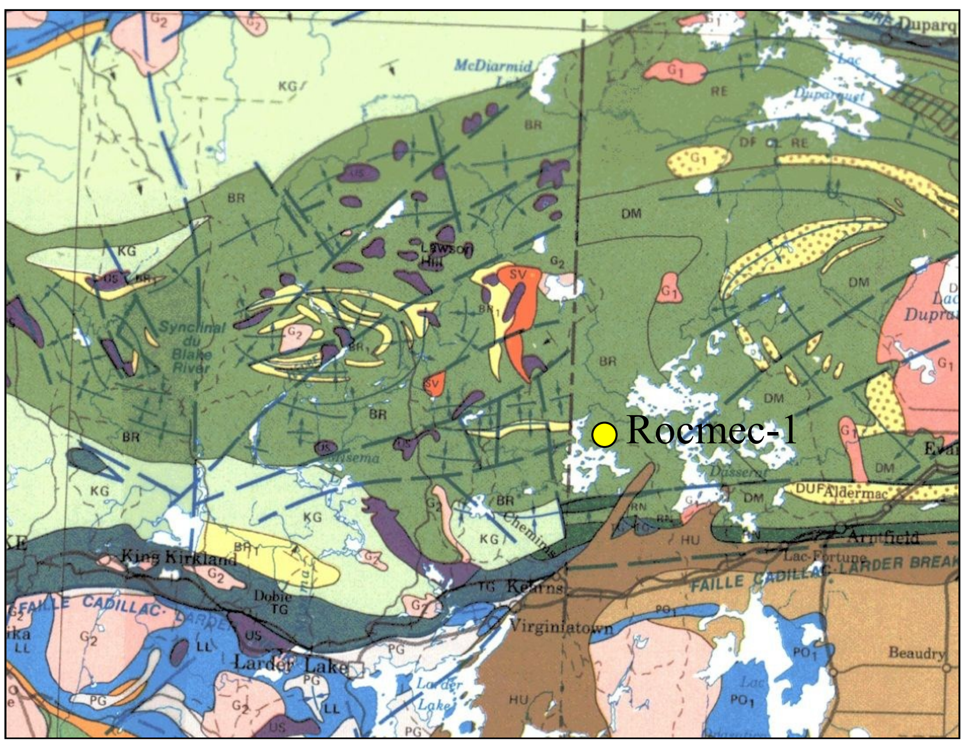


Figure 5. Location of the Romec-1 deposit, Québec, within the Blake River assemblage (dark green) in relation to the northeast-trending faults. The dashed rectangle indicates the area of the map in Figure 6. After Map 2484 (OGS–MERQ 1984).

Figure 5 shows the location of the Rocmec-1 deposit. It appears to be on the projection of a fault that terminates on the Ontario–Québec border. The Kirkland Lake Fault is a splay fault off the Larder Lake–Cadillac Fault Zone, trending

Gold Deposits in the Blake River Assemblage …cont'd

northeast from the Kenogami Lake area, west of Kirkland Lake. East of Kirkland Lake, in Lebel Township, the fault trifurcates in the Victoria Lake area. The same faults are shown on the Abitibi compilation data set (Figure 6; data from Ayer, Trowell and Josey 2004). The southern branch extends to the Rocmec-1 deposit area.

Mineral occurrences are plotted on Figure 6 as follows: Au ± base metals (yellow circles), base metals (orange circles), iron (black circles), kimberlite (purple diamonds) and diamonds (white diamonds). In the upper portion of the figure, there is an apparent spatial relationship of the mineral deposits and structure. The majority of the mineral showings are classified as occurrences indicating that mineralization has not been identified in 3 dimensions with 3 different samples including drilling. Therefore, follow-up exploration along these structures, especially near north- to northwest-trending structures, may prove fruitful. With the rise in gold prices, smaller gold deposits, similar to Rocmec-1, are becoming targets for exploration.

Focused exploration along the northeast-trending structures is required.

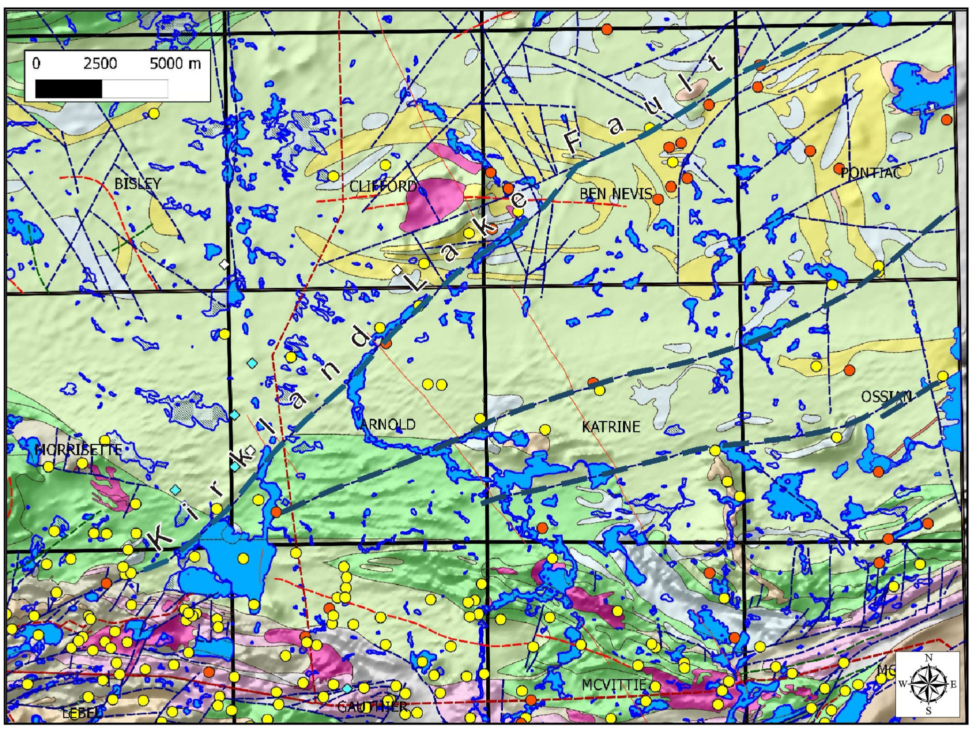


Figure 6. Mineral occurrences plotted on geology overlying airborne magnetics. Mineral occurrences are plotted as follows: Au ± base metals (yellow circles), base metals (orange circles), iron (black circles), kimberlite (purple diamonds) and diamonds (white diamonds). Data from MRD 143 (Ayer, Trowell and Josey 2004).

Ayer, J.A., Trowell, N.F. and Josey, S. 2004. Geological compilation of the Abitibi greenstone belt; Ontario Geological Survey, Miscellaneous Release—Data 143.

Duplessis, C. and Dupéré, M. 2007. Technical report: Resource modeling and estimation Rocmec 1 (Russian Kid) Gold deposit Corporation Minière Rocmec Inc.; prepared for Corporation Minière Rocmec Inc., Systèmes Géostat International Inc. 108p.

Gold Deposits in the Blake River Assemblage …cont'd

Ontario Geological Survey & Ministere de l'Energie et des Ressources, Québec. 1984. Lithostratigraphic map of the Abitibi subprovince; Ontario Geological Survey, Map 2482, scale 1: 500 000.

Ross, P.-S., Goutier, J., Legault, M., Grunsky, E. and Dubé, B. 2009. New volcanological and geochemical observations from the Blake River Group, Abitibi Greenstone Belt, Ontario and Québec: Tannahill Township and Lake Labyrinth area; Geological Survey of Canada, Current Research 2009-8, 23p.

HIGHLIGHTS

- **Interest in mineral collecting and mineral tourism is strong. Many old collecting sites in SE Ontario are no longer accessible.**
- **The Bancroft Terrane hosts a wide variety of mineral occurrences associated with nepheline syenite, carbonatite, and pegmatite. New occurrences exhibiting spectacular specimens have been discovered in recent years.**

Contact:
Peter LeBaron, Pam Sangster and Debbie Laidlaw
peter.lebaron@ontario.ca
pam.sangster@ontario.ca
debbie.laidlaw@ontario.ca
(613) 478-2195 Ph.

Exploration for Mineral Collecting Sites, Southeastern Ontario

Southeastern Ontario has long been valued by rockhounds for the wide variety of rocks and minerals that are available for collecting. There continues to be interest in mineral collecting by geologists, mineral dealers, amateur collectors and by municipalities interested in developing mineral tourism opportunities. However, in recent years, many of the sites are either becoming exhausted of reserves or have become inaccessible due to changes in property ownership, rehabilitation of old mines and prospects, land development and the creation of new parks and protected areas. Most of the established collecting sites were discovered through exploration and development of economic mineral deposits such as fluorite, uranium, apatite, quartz, and feldspar, which, in the early to mid-1900s could be mined profitably on a relatively small scale. With some exceptions, such as rare earth elements and high-purity silica, these small vein and pegmatite dike-hosted deposits are not considered to have high potential for metallic or industrial mineral production but may be valuable as mineral collecting sites.

One of the most prospective areas for the discovery of new mineral collecting sites is the Bancroft Terrane of the Central Metasedimentary Belt. The town of Bancroft, known as the Mineral Capital of Canada, hosts the annual Rockhound Gemboree, Canada’s largest gem and mineral show. The Bancroft Terrane (Figure 7) is an area of low to upper amphibolite-grade metamorphism dominated by a sequence of marbles and quartzofeldspathic gneisses (Easton 1992). Nepheline syenites, carbonatite dikes and pegmatite dikes are widespread and are host to many of the past producers (uranium, molybdenum, beryllium, mica, feldspar, quartz, corundum, apatite) and current mineral collecting sites. A partial list of the minerals associated with each rock type is:

Nepheline syenite: nepheline, sodalite, cancrinite, corundum

Carbonatite dikes: calcite, apatite, titanite, hornblende, biotite, microcline, fluorite, fluorrichterite, tremolite, actinolite.

Pegmatite dikes: quartz, rose quartz, feldspar (perthite, moonstone, amazonite), tourmaline, mica, hornblende, beryl, euxenite, columbite, molybdenite.

Recent new discoveries of carbonatite and pegmatite dikes in the Bancroft Terrane, some of which contain spectacular mineral specimens, indicate that there is potential for locating new mineral collecting sites in southeastern Ontario. The Mineral Deposit Inventory database, maintained by the Ontario Geological Survey (at http://www.geologyontario.mndm.gov.on.ca/), contains references to numerous occurrences of rare minerals that warrant further investigation.

Exploration for Mineral Collecting Sites, Southeastern Ontario …cont'd

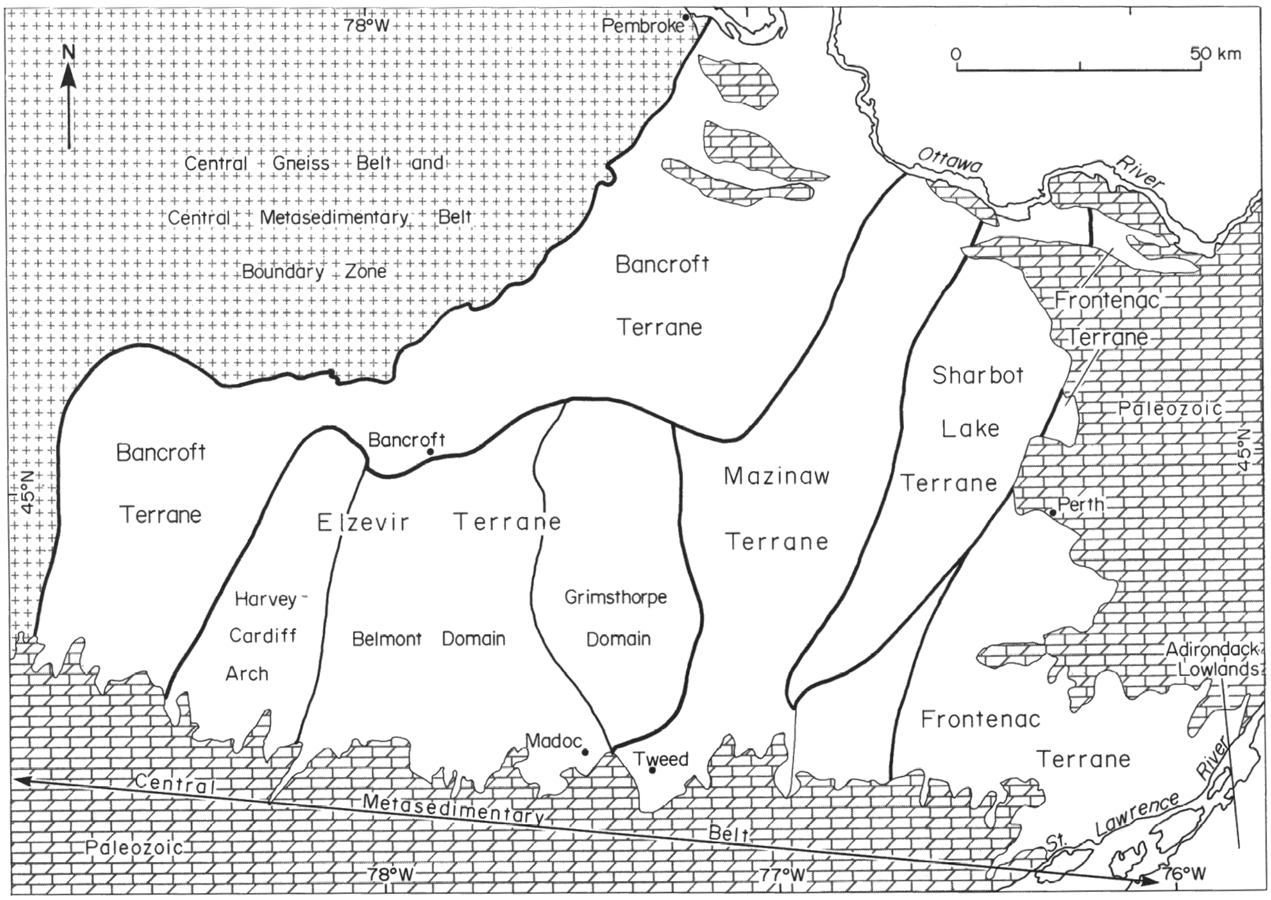


Figure 7. Lithotectonic terranes and domains of the Central Sedimentary Belt, southeastern Ontario (Easton 1992).

Easton, R.M. 1992. The Grenville Province and the Proterozoic history of central and southern Ontario; *in* Geology of Ontario, Ontario Geological Survey, Special Volume 4, Part 2, p.714-904.

HIGHLIGHTS

- **Marble belts of southeastern Ontario have a history of production of stone products, mineral fillers and magnesium metal.**
- **SE Ontario hosts deposits of high-purity, high-brightness calcium carbonate used by the paper, plastics and paint industries.**
- **SE Ontario dolomitic marble was quarried near Renfrew to produce magnesium metal for 63 years. There is currently no magnesium metal production in Canada.**

Contact:

Peter LeBaron, Pam Sangster and Debbie Laidlaw

peter.lebaron@ontario.ca

pam.sangster@ontario.ca

debbie.laidlaw@ontario.ca

(613) 478-2195 Ph.

High-Purity Calcitic and Dolomitic Marble Potential, Southeastern Ontario

Marble belts of the Grenville Province in southeastern Ontario (Figure 8) contain zones of high-purity calcitic and dolomitic marble which are currently quarried as sources of mineral filler for the paint, paper, plastics and pharmaceutical industries; terrazzo, decorative stone and landscaping stone. Until recently a deposit of high-magnesium dolomitic marble was extracted and refined to produce magnesium metal.

The market for ground calcium carbonate (GCC) grew from 56Mt in 2004 to 72Mt in 2007 and was forecast to continue to grow at an annual growth rate of 4% to 2012 (Roskill Information Services 2008). The paper, plastics, and paint industries are the largest users of GCC, requiring high-brightness and whiteness ground products as are currently produced by OMYA Canada Inc. from a high-purity calcitic marble deposit in the Perth area. Challenges facing the paper industry and competition from other mineral fillers has had an impact on the demand for GCC fillers, however, the market for high purity resources remains.

High-purity dolomitic marble was quarried for the production of magnesium metal at Haley Station near Renfrew. The quarry and plant were operated originally by Dominion Magnesium Limited and later by Timminco Metals for a total of 63 years before ceasing production in 2007. Canada currently has no magnesium metal production. Magnesium and its alloys are used in the production of every type of vehicle because of their combination of high tensile strength, elastic modulus and low density as manufacturers try to improve energy efficiency (Brown 2009).

In any high-purity marble quarry operation, lower grades of both calcitic and dolomitic marble have potential applications in the stone industry as terrazzo, decorative aggregate, landscaping stone and lower-specification mineral fillers.

The geology and geochemistry of Grenville marble belts and specific prospects are documented in the following Ontario Geological Survey reports:

1. Geochemistry of Grenville Marble in Southeastern Ontario, Mineral Deposits Circular 28, 1989.
2. Precambrian Dolomite Resources in Southeastern Ontario, Open File Report 5712, 1990.
3. High-Purity Calcite and Dolomite Resources of Ontario, Open File Report 5954, 1996.

High-Purity Calcitic and Dolomitic Marble Potential, Southeastern Ontario …cont'd

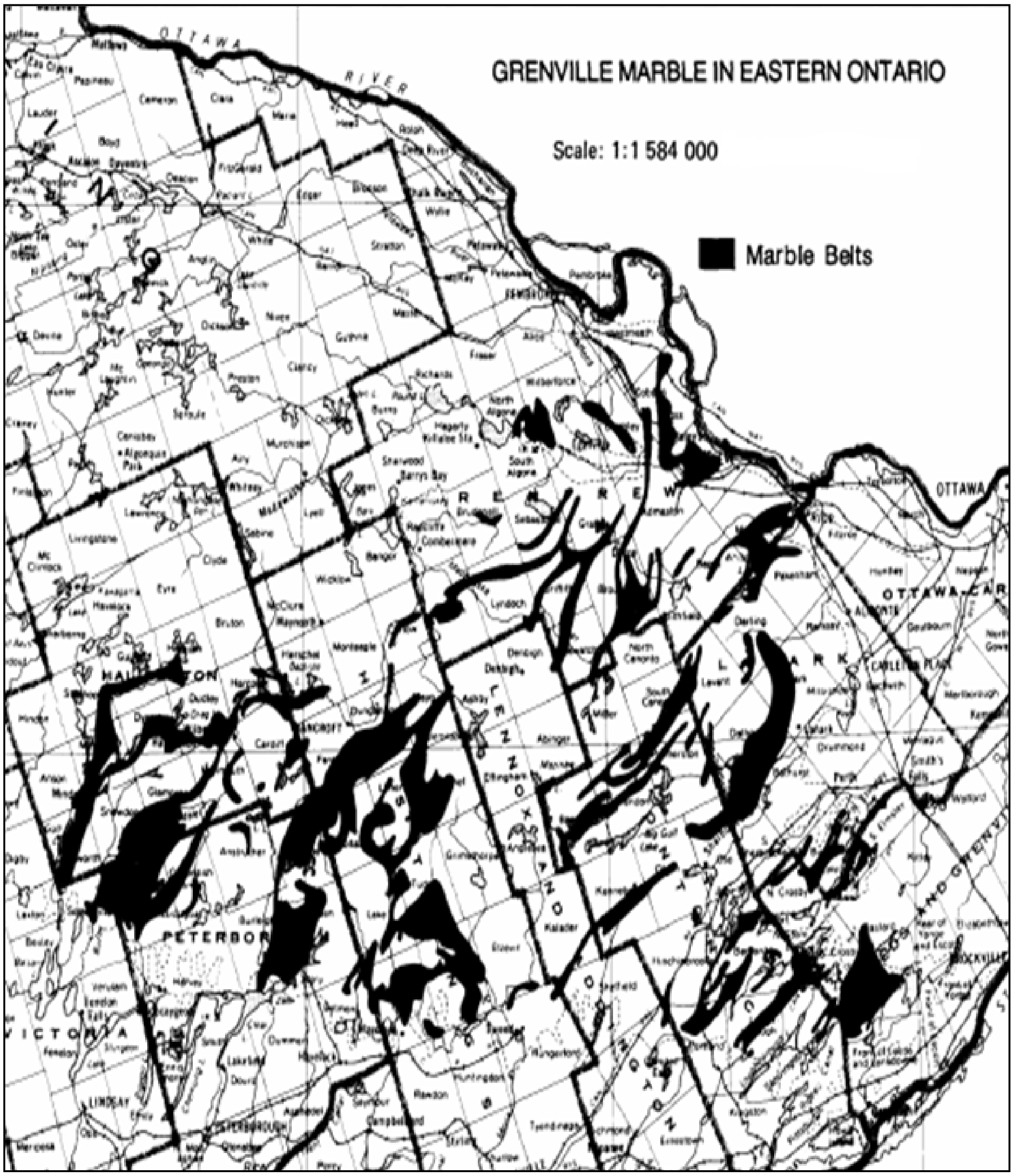


Figure 8. Distribution of major marble belts in the central Metasedimentary Belt, Grenville Province, southeastern Ontario (Hewitt, 1964).

Brown, Robert E. 2009. Magnesium in the 21st Century; article in Entrepreneur Journal, January 2009; www.entrepreneur.com.

Hewitt, D.F. 1964. Building Stones of Ontario, Part III, Marble; Ontario Department of Mines, Industrial Mineral Report 16, 89p.

Roskill Information Services, 2008. The Economics of Ground Calcium Carbonate, 3rd Edition, 327p.

HIGHLIGHTS

- **Au hosted in brecciated, chloritized albitite**
- **Six (6) Past producers / Numerous Prospects**
- **U-Pb geochronology alludes to 1700 +/- 2 Ma alkalic magmatism**

Contact:
Michael Cosec
mike.cosec@ontario.ca
(705) 670-5735 Ph.
Dan Farrow
dan.farrow@ontario.ca
(705) 670-5741 Ph.

Soda Metasomatic-hosted Gold

Several small gold deposits are hosted in regionally albitized sedimentary rocks of the Paleoproterozoic upper Huronian Supergroup of the Southern Province of the Canadian Shield. A conservative production figure is approximately 40 000 ounces Au with a grade ranging between 0.1 ounce per ton to 0.3 ounce per ton. Copper in the form of chalcopyrite and bornite was also recovered. Historical data are unreliable (Gordon, J.B. et al., 1979).

The most prominent zones of alteration are located south and east of Wanapitei Lake and the Espanola - Whitefish Falls area.

Elevated levels of rare earth elements (REE) were identified in the host rocks. This may suggest carbonatitic or alkalic intrusions at depth as an aid in mineralization (Schandl, E.S. et al., 1994). The authors have observed such rocks in areas of recent stripping and trenching.

Gordon, J.B., Lovell, H.L., de Grijs, Jan, and Davie, R.F. 1979: Gold deposits of Ontario, part 2; Part of District of Cochrane, Districts of Muskoka, Parry Sound, Sudbury, Timiskaming, and Counties of southern Ontario; Ontario Geological Survey, Mineral Deposits Circular 18, 253p.

Schandl, E.S., Gorton, M.P., Davis, D.W. 1994: Albitization at 1700 +/- 2 Ma in the Sudbury - Wanapitei Lake area, Ontario; implications for deep-seated magmatism in the Southern Province. Canadian Journal of Earth Science. vol. 31, 597-607.

HIGHLIGHTS

- **"The Main Trench" consists of a sphalerite-bearing lens traced 30 metres in strike length.**
- **An OGS lake sediment geochemical survey has revealed significant anomalies in Zn, Cd, and Cu, suggesting the underlying stratigraphy is consistent with metal association typical of Archean volcanic-associated massive sulphide deposits.**
- **A weighted average of 8.53% Zn from grab samples and 3.37% Zn over 2.43 m from drill core.**

Contact:
Anthony Pace
anthony.pace@ontario.ca
(705) 945-6931 Ph.

Zinc-Lead-Copper Potential in the Eastern Batchawana Greenstone Belt

Zinc-lead-copper mineralization has been identified in the Hanes Lake area. The area, situated in Gapp Township approximately 70 km northeast of Sault-Ste. Marie, provides intriguing opportunities for mineral exploration due to widespread showings of zinc-lead-copper mineralization. Many of the base metal occurrences are located within a calc-alkalic metavolcanic sequence of rocks of the Dismal Lake Assemblage (2700 to 2698 Ma) that makes up the eastern domain of the Batchawana Greenstone Belt (Grunsky 1991).

Exploration done in the past has included trenching, diamond drilling, channel sampling and geophysical surveying. The trenching involved the excavation of 7 trenches in the Hanes Lake area that were identified as having anomalous of zinc-copper-lead values.

The trench that returned the best results has been described as the "Main Trench". The rocks exposed in it consist of a banded chert-sulphide exhalite hosted in a localized interflow metasedimentary unit. The metasedimentary unit is interstratified with mafic metavolcanic rocks that have been intruded by later gabbroic sills. The banded chert-sulphide exhalite strikes east-west and is characterized by white and black chert bands interbedded with thin units of argillite.

The mineralization occurs in a rusty gossan-like sequence of graphite, argillite, and chert. The sulphides include disseminated pyrite and pyrrhotite, along with a sphalerite-bearing lens that measures 0.3 to 0.75 metres wide and has been traced along a strike length of 30 m (see Figure 9). It returned a weighted average grade of 8.53% zinc with negligible copper, lead, silver and gold values (Noranda Exploration Ltd, Assessment File, 1991).

Figure 9. Photo illustrating the Banded chert-sulphide exhalite described as "The Main Trench" consisting of a sphalerite-bearing lens traced along a strike length of 30 metres.

Zinc-Lead-Copper Potential in the Eastern Batchawana Greenstone Belt …cont'd

Diamond drilling surrounding the "Main Trench" consisted of 5 shallow drill holes with one hole returning a weighted average grade of 3.37% Zn across a core length of 2.43 m (Noranda Exploration Ltd, Assessment File, 1991).

The Dismal Lake assemblage, particularly in areas within the Hanes Lake area underlies some strong base metal lake sediment geochemical anomalies identified in a survey of the Batchawana greenstone belt done by the Ontario Geological Survey (Hamilton, Fortescue and Hardy 1995). The survey revealed significant anomalies in Zn, Cd, and Cu, suggesting the underlying stratigraphy is consistent with metal association typical of Archean volcanic-associated massive sulphide deposits.

The area remains available for staking.

Grunsky, C.E, 1980. Geology of the Cowie Lake Area, District of Algoma; Ontario Geolgocial Survey, Report 192, map 2426.

Grunsky, C.E., 1991. Geology of the Batchawana Area, District of Algoma; Ontario Geological Survey, OFR 5791.

Hamilton, M.S., Fortescue, C.A.J., Hardy, S.A., 1995. A Zinc-Cadmium-Copper Anomaly: Preliminary Results of the Cow River Geochemical Mapping Project, Batchawana Greenstone Belt, OFR 5917, 31p.

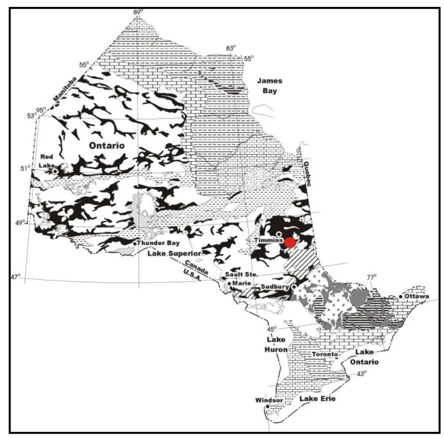
Tylee, Ken, D., 1991. Report on a Diamond Drill Program carried out on the Wolverine Option: Noranda Exploration Company Ltd., Assessment File, SSMP Gapp-15.

HIGHLIGHTS

- **Volcanogenic Massive Sulphides under explored in the Deloro Assemblage, Abitibi Subprovince**

Volcanic-Hosted Massive Sulphides (VMS) in the Deloro Assemblage, Abitibi Subprovince

Recent mapping, geochemical and geochronological investigations in the Bartlett Dome (Houlé, Préfontaine and Brown 2008; Houlé et. al. 2008; Baldwin et al. 2008) have identified, dated and defined Deloro assemblage rocks in contact with komatiitic rocks of the Tisdale assemblage. Thin interflow units of mafic metavolcanic rocks intervene within a discreet horizon of chert iron formation in Bartlett and McArthur townships. Geochemical analyses of banded iron formation contained within felsic volcanic rocks have been completed by Baldwin et al. (2008), indicating that the rocks are hydrothermally altered and silicified. Mineralogically, the chemical sediments include sulphide facies, carbonate facies and silicate facies members. In a diamond drilling program in the area done by Marceau Lake Explorations Limited in 1965, a 76 cm wide drill intersection of sulphide bearing iron formation assayed 0.2% copper, 2% zinc, 0.05% lead and 0.01% nickel (Pyke 1978). The drilling demonstrates that the iron formation can be mineralized with sulphides. That fact, combined with the coarse fragmental character of footwall rocks to the iron formation makes the area very prospective for volcanogenic massive sulphide mineralization.



Traditionally, in the Timmins area, Deloro assemblage rocks have received less exploration emphasis compared to the Kidd Munro and Blake River assemblage rocks, in part because the latter assemblages are proven to contain economic concentrations of VMS mineralization such as the Kidd Creek Mine and the smaller deposits around Kamiskotia. However, the Deloro assemblage rocks, despite their chemical differences, are time correlative with rocks that host significant VMS deposits in Quebec (eg., Selbaie Mine, Joutel Mine and Normetal Mine) and Confederation assemblage rocks that host VMS mineralization near Red Lake (South Bay Mine, Thurston 1985) and in the McFaulds Lake area (Rayner and Stott 2005). Deloro assemblage rocks in the Abitibi subprovince should be reconsidered for VMS exploration.

Baldwin, G., Thurston, P.C., Kamber, B.S. and Houlé, M.G. 2008. The Deloro-Tisdale sedimentary interface zones of the Abitibi greenstone belt: an example from McArthur Township, Ontario: Institute on Lake Superior Geology, Proceedings, vol. 54, Pt 1, p.5.

Houlé, M.G., Ayer, J.A., Baldwin, G., Berger, B.R., Dinel, E., Fowler, A.D., Moulton, B., Saumur, B.-M., and Thurston, P.C. 2008. Field trip guidebook to the stratigraphy and volcanology of supracrustal assemblages hosting base metal and gold mineralization in the Abitibi greenstone belt, Timmins, Ontario; Ontario Geological Survey, Open File Report 6225, 84p.

Houlé, M.G., Préfontaine, S. and Brown, G.H. 2008. Geology and mineral potential of English and Zavitz Townships in the Bartlett Dome, Abitibi greenstone belt; Ontario Geological Survey, Open File Report 6226, p.10-1 to 10-17.

Pyke, D.R. 1978. Geology of the Redstone River Area, District of Timiskaming; Ontario Division of Mines, GR 161, 75p.

Contact:
Brian Atkinson
brian.atkinson@ontario.ca
(705) 235-1619 Ph.

HIGHLIGHTS

- **Preliminary field evaluation indicates potential hydrothermal altered metavolcanic rocks similar to the alteration of the past producing Cu-Zn deposits at Geco and Winston Lake.**

New exposures enhance the Volcanogenic Massive Sulphide potential of the Eayrs Lake - Starnes Lake Area, Thunder Bay

Recent logging south of the Trans-Canada Pipeline, south of the west end of Whitefin Lake, and north of Blowing Lake, has exposed a sequence of volcanic rocks that appear to have been hydrothermally altered and the alteration appears to be typical of footwall alteration to a copper-zinc massive sulphide deposit. The area was mapped by Kaye (1969) and the geology is depicted on Ontario Department of Mines Map 2172, the Eayrs Lake - Starnes Lake Area (322100E, 5429100N; UTM Zone 16, NAD 83).

A preliminary field examination in the area indicates the metavolcanic rocks are deformed, however primary features such as pillows and fragmental aspects of the rocks can still be discerned. Garnets, in places form up to 30% of the rock (see photo) as pinkish clots in the amphibole rich rock, but generally occur as prominent large coalesced patches of garnet crystals. The pillow selvages are also garnetiferous. Some of the pillowed flows are very dark green to almost black in color. This alteration package also occurs along strike to the northeast within the same volcanic sequence, at Peevy Lake near Highway 527, a distance of about 10 km.

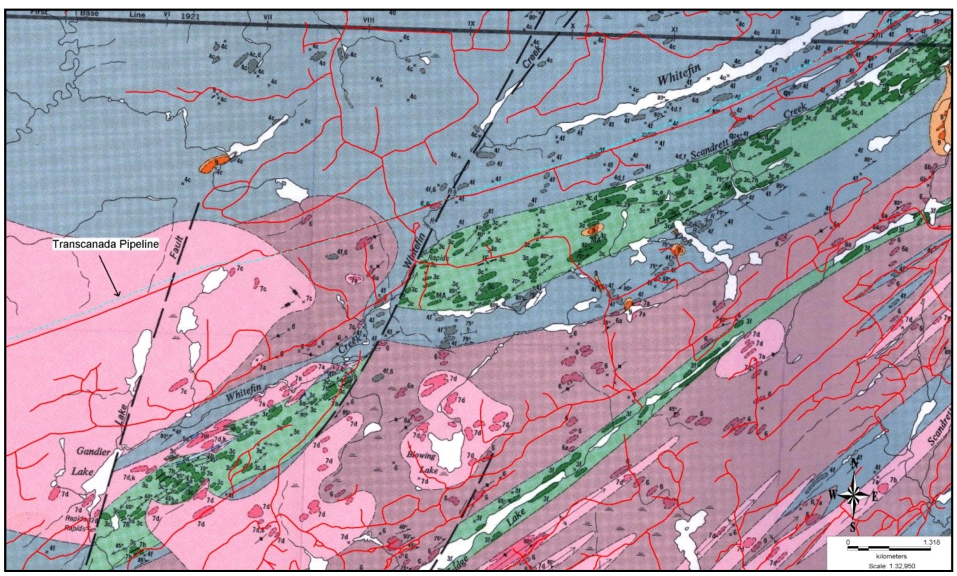


Figure 10. Location map (*after* Kaye 1969)

The question as to whether this is in fact a hydrothermally altered sequence of volcanic rocks, or a product of regional metamorphism, has to be answered. Visually, the rocks are very similar to the footwall sequence at Manitouwadge, Winston Lake, and the footwall altered rocks at the recent Freewest (Canada) Exploration VMS discovery at Wye Lake in the western Shebandowan belt.

A lithogeochemical sampling program is recommended to determine the nature of these altered rocks and thus whether further exploration for volcanogenic massive sulphides is warranted. An airborne magnetometer and EM survey should also be considered for the volcanic package to delineate any possible present conductors. Logging in the area has exposed more rock outcrops making sampling and mapping that much easier.

Contact:
John Scott
Dorothy Campbell
john.f.scott@ontario.ca
dorothy.campbell@ontario.ca
(807) 475-1331 Ph.

New exposures enhance the Volcanogenic Massive Sulphide potential of the Eayrs Lake - Starnes Lake Area, Thunder Bay …cont'd

A search of the assessment files reveals that portions of the area have been subjected to cursory exploration by prospectors and some exploration companies who have conducted surface exploration that included ground magnetometer and EM-VLF surveys, sampling, and in one case, shallow diamond drilling to a maximum depth of 90 feet. Some of this work was completed almost thirty years ago and the area should re-assessed using modern technology.

Figure 11. Upper Left: Sheared mafic metavolcanics with garnet/amphibole/silicification alteration
Upper Right: Sheared mafic metavolcanic with garnet/amphibole alteration: might be fragmental.
Middle Left: Massive mafic metavolcanics with 25 - 30 % garnets
Middle Right: Fragmental metavolcanic with sulphide burn
Lower Left: Fragmental metavolcanic with sulphide burn
Lower Right: Mafic metavolcanic, pillowed, with garnet/carbonate rich pillow selvages

Kaye, L., 1969. Eayrs Lake-Starnes Lake Area, District of Thunder Bay, Ontario Department of Mines Geological Report 77, Map 2172.

HIGHLIGHTS

- **Preliminary field examination by the authors confirmed the occurrence of a series of white pegmatite outcrops with beryl tentatively identified.**

Recent logging activity enhances access to Beryl occurrence, Eayrs Lake - Starnes Lake Area, Thunder Bay

An occurrence of beryl in a white albite pegmatitic rock was discovered by Jollife (1934) while mapping the Block Creek area for the Geological Survey of Canada. The occurrence, as determined from his map, is located approximately 1.5 km northwest of Tackle Lake. Kaye (1969) did not locate this occurrence during the mapping of the Eayrs Lake - Starnes Lake area; however recent logging has now provided good access to the general vicinity of the occurrence. High resolution satellite images reveal some stark white outcrops along roads and in logged out areas in the vicinity of where the occurrence is said to be, and these outcrops should be prime targets for investigation.

The following maps depict the general area and geology of the occurrence. Figure 12 is a general location map derived from location information taken from Jollife (1934); Figure 13 depicts the general geology of the area as shown on Compilation Map 2065 after Pye and Fenwick (1965); and Figure 14 illustrates the newer logging roads in the area.

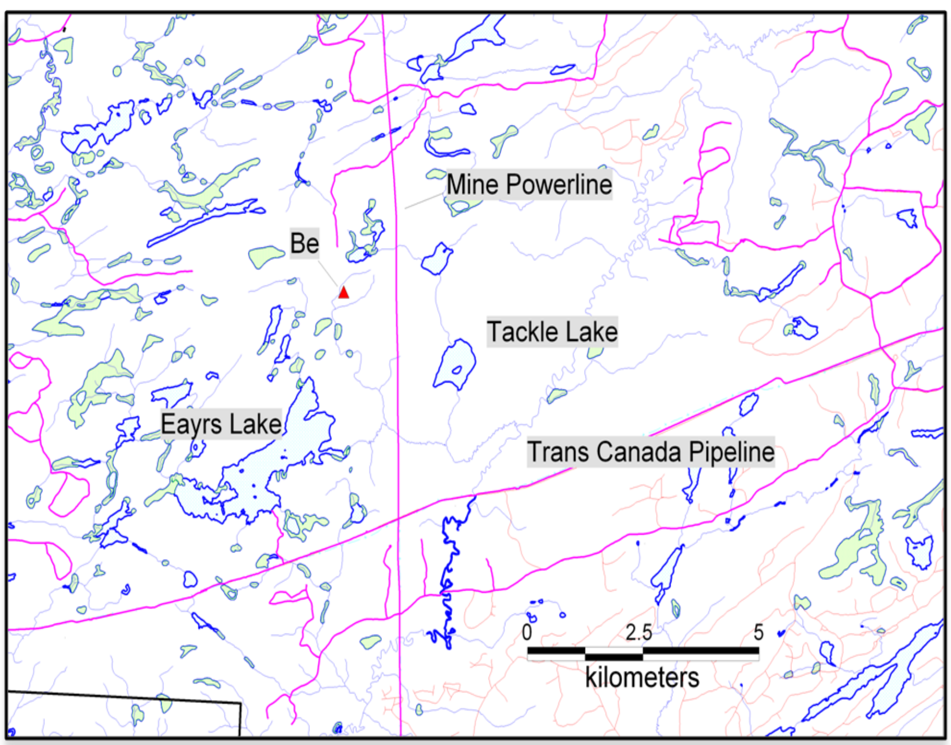


Figure 12. General Location of the beryl occurrence after Jollife (1934).

Contact:
John Scott
Dorothy Campbell
john.f.scott@ontario.ca
dorothy.campbell@ontario.ca
(807) 475-1331 Ph.

Recent logging activity enhances access to Beryl occurrence, Eayrs Lake - Starnes Lake Area, Thunder Bay …cont'd

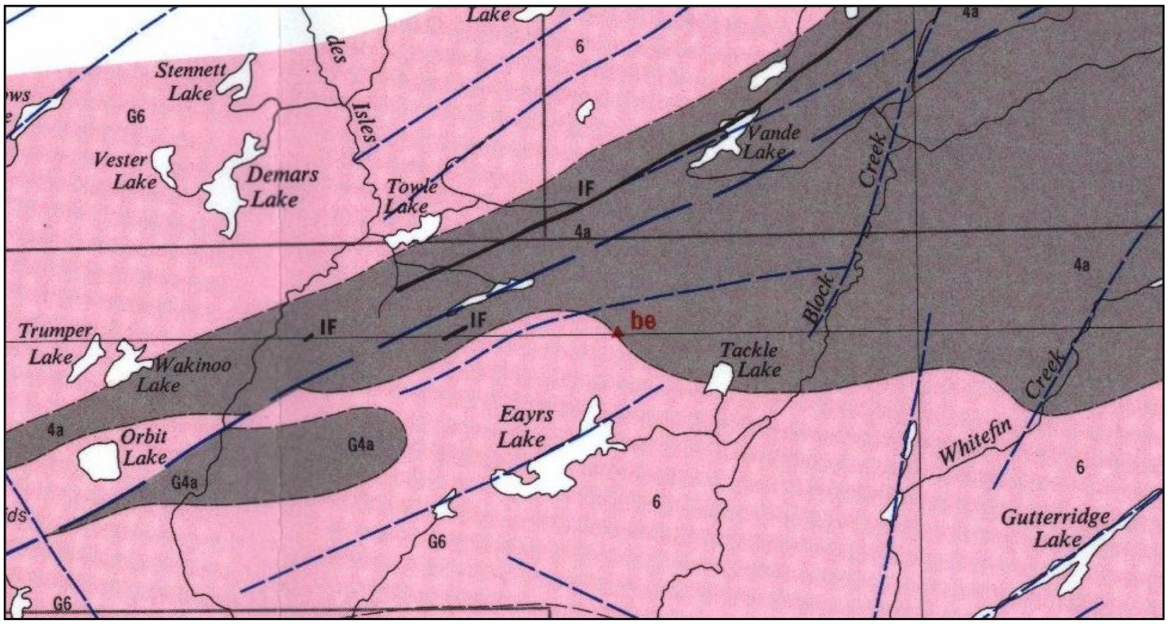


Figure 13. General Geology of the Eayrs Lake area after Pye and Fenwick (1965).

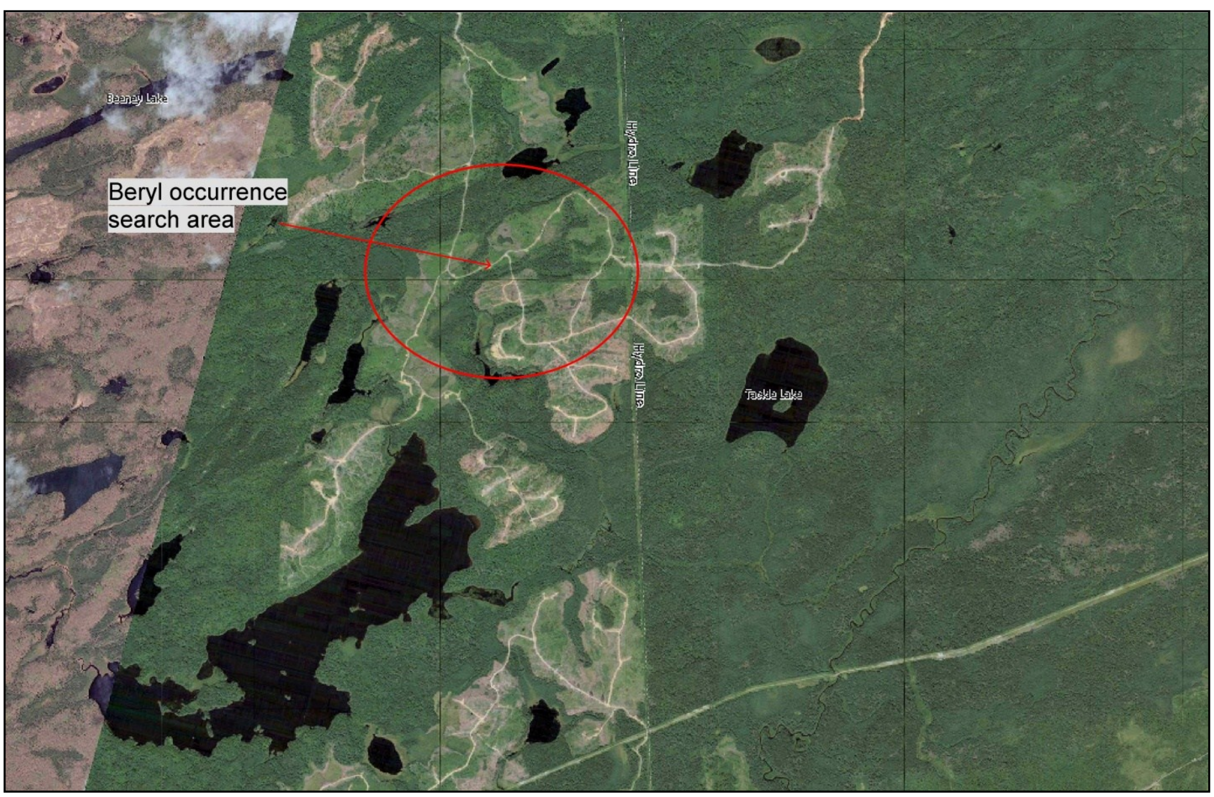


Figure 14. Suggested search area for beryl occurrence described by Jollife (1934)

Recent logging activity enhances access to Beryl occurrence, Eayrs Lake - Starnes Lake Area, Thunder Bay …cont'd

A preliminary field examination by the authors confirmed the occurrence of a series of white pegmatite outcrops at the junction of three bush roads located at UTM coordinates 308770E, 5430717N (UTM Zone 16, Nad 83). These are white albite-muscovite-quartz pegmatites. A beryl crystal was tentatively identified. The area south of the metasedimentary - granite contact should be prospected for more pegmatite rocks that may contain beryl.

BirdsEye™ Satellite Imagery with BaseCamp™ by Garmin, October 2010. https://buy.garmin.com/shop/shop.do?pID=70144

Jollife F, 1934. Block Creek Map-area, Thunder Bay District, Ontario, Geological Survey of Canada, Summary Report 1933, Part D.

Kaye, L., 1969. Eayrs Lake-Starnes Lake Area, District of Thunder Bay, Ontario Department of Mines Geological Report 77, Map 2172.

Pye E.G. and Fenwick K.G., 1965. Atikokan-Lakehead Geological Compilation Series, Kenora, Rainy River and Thunder Bay Districts, Ontario Department of Mines, Map 2065.

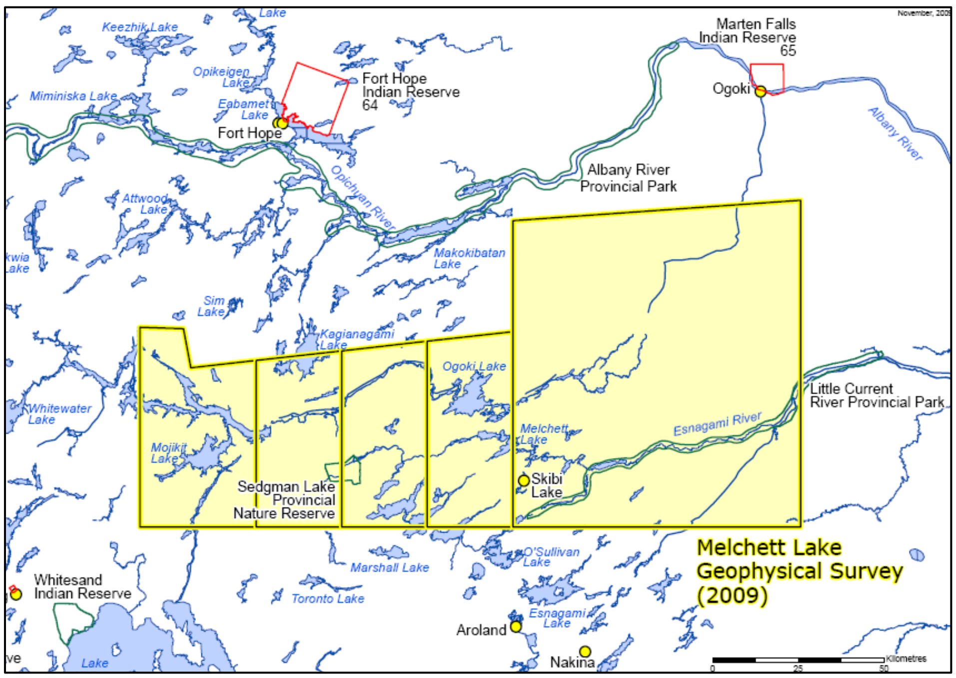
HIGHLIGHTS

- **The under-explored Melchett Lake greenstone belt hosts a major banded iron formation and numerous gold and base metal occurrences.**
- **Mafic sills of the northernmost portion of the Nipigon embayment have the potential to host Cu-Ni-PGE mineralization.**
- **Circular magnetic anomalies within the survey area may represent Kimberlite targets similar to Attawapiskat-type signatures.**

Contact:
Mark Smyk
Gerry White
mark.smyk@ontario.ca
gerry.white@ontario.ca
(807) 475-1331 Ph.

Interpretation of Melchett Lake Airborne Magnetic Survey

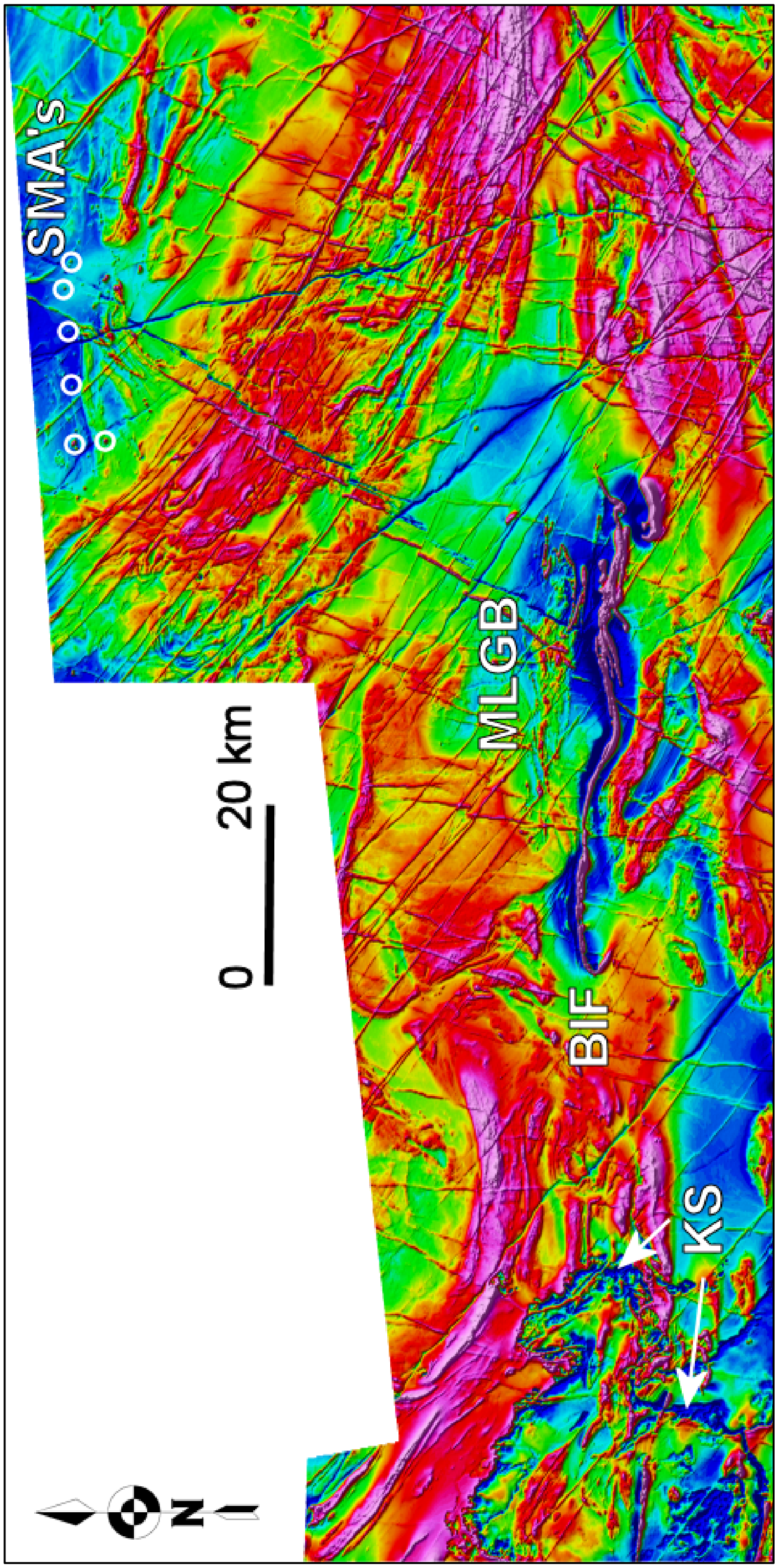
The Ontario Geological Survey (OGS) carried out an aeromagnetic survey in the Melchett Lake area, north of Nakina from November 2009 to March 2010. The airborne magnetic data were released in August 2010 (Ontario Geological Survey 2010). A detailed interpretation of these aeromagnetic data was completed by Stott and Rainsford (in press). The new survey ties into the Fort Hope area geophysical survey (Ontario Geological Survey 2003) to the north and the Albany River–James Bay area geophysical survey (Ontario Geological Survey 2002) to the east (see map below).



The survey area largely straddles high-grade, gneissic, metasedimentary and granitoid rocks of the English River Basin between the Neoarchean Uchi Domain (including the Fort Hope greenstone belt) to the north and the Winnipeg River (Caribou Lake greenstone belt) and Marmion terranes (Marshall Lake and O'Sullivan Lake greenstone belts) to the south. The Melchett Lake greenstone belt (MLGB) occurs in the midst of this high-grade gneissic terrane. A number of geological features and major lithologic units are apparent in the coloured image of the total field aeromagnetic data (see map below).

The Melchett Lake greenstone belt (MLGB), consisting largely of felsic metavolcanic rocks (Bond and Foster 1981a,b; Devaney 1999), is flanked to the south by the Melchett Lake banded iron formation (BIF), which extends for over 60 km. The MLGB hosts a number of gold and base metal occurrences, some of which suggest a volcanogenic massive sulphide environment. The BIF was the focus of iron exploration in the 1960's and hosts 2 iron resources: Skibi Lake (335 000 000 tons of 26.2% acid-soluble Fe) and Stewart Lake (49 500 000 tons grading 30% Fe). The Summit Lake BIF, 20 km south of the western end of the Melchett Lake BIF has a resource of 40 000 000 tons @ 30% Fe (Shklanka 1968).

Interpretation of Melchett Lake Airborne Magnetic Survey …cont'd



Total Field Magnetic Image, Melchett Lake area survey

MLGB – Melchett Lake Greenstone Belt;
BIF – Banded iron formation;
KS – Keweenawan sills;
SMA's – Sub-circular magnetic anomalies

Interpretation of Melchett Lake Airborne Magnetic Survey …cont'd

Keweenawan mafic sills (KS), representing the northernmost part of the Mesoproterozoic Midcontinent Rift (MCR), occur in the Nipigon Embayment, north of Lake Nipigon (cf. Macdonald 2006). They should be investigated for their copper-nickel-platinum group element potential, based on recent discoveries in coeval ultramafic intrusions in the Nipigon Embayment (e.g. Current Lake; Seagull) and elsewhere in the MCR (e.g. Eagle; Tamarack).

Several Proterozoic dyke swarms are also evident (cf. Stott and Josey 2009). A number of small, sub-circular magnetic anomalies (SMA's) occur in the survey area; many are spatially related to these dykes. Some of these anomalies have been circled as examples on the accompanying map. Many resemble the size and magnetic signature of kimberlite pipes, such as the 1100 Ma Kyle pipes and ca. 170-190 Ma Attawapiskat pipes to the northeast.

Bond, W.D. and Foster, J.R. 1981a. Precambrian geology of the Melchett Lake area (west part), Thunder Bay District; Ontario Geological Survey, Preliminary Map P.2392, scale 1:15 840.

——— 1981b. Precambrian geology of the Melchett Lake area (east part), Thunder Bay District; Ontario Geological Survey, Preliminary Map P.2393, scale 1:15 840.

Devaney, J.R. 1999. Precambrian geology of the Colpitts–Bury lakes area (eastern Melchett Lake greenstone belt); Ontario Geological Survey, Open File Report 5983, 96p.

MacDonald, C.A. 2006. Precambrian geology of the east-central Caribou Lake greenstone belt; in Summary of Field Work and Other Activities 2006, Ontario Geological Survey, Open File Report 6192, p.10-1 to 10-17.

Ontario Geological Survey 2002. Ontario airborne geophysical surveys, magnetic and electromagnetic data, Albany River–James Bay area; Ontario Geological Survey, Geophysical Data Set 1209–Revised.

——— 2003. Ontario airborne geophysical surveys, magnetic data, Fort Hope (Blocks 1, 2 and 3) area; Ontario Geological Survey, Geophysical Data Set 1109.

——— 2006. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release—Data 126–Revised.

——— 2010. Ontario airborne geophysical surveys, magnetic data, Melchett Lake region; Ontario Geological Survey, Geophysical Data Set 1067.

Shklanka, R. 1968. Iron deposits of Ontario; Ontario Department of Mines, Mineral Resources Circular No. 11, 489p.

Stott, G.M. and Josey, S.D. 2009. Proterozoic mafic (diabase) dikes and other post-Archean intrusions of northwestern Ontario, north of latitude 49°30′; Ontario Geological Survey, Preliminary Map P.3606, scale 1:1 000 000.

Stott, G.M. and Rainsford, D. (in press). Some Preliminary Interpretation Highlights of the Melchett Lake Airborne Magnetic Data, Eastern English River Subprovince,
Northwestern Ontario; Summary of Field Work and Other Activities 2010, Ontario Geological Survey, Open File Report 6260, p.24-1 to 24-11.

HIGHLIGHTS

- **PGE Ni-Cu occurrences in the Kenora District are known to occur within ultramafic, mafic and intermediate intrusive rocks.**
- **Historical exploration in most areas has not evaluated the PGE potential but mainly focused on nickel copper potential.**
- **In addition to staking of large amounts of open Crown Land, there exists significant opportunity for option or joint venture agreements, or revitalization of dormant exploration projects.**

Contact:
Craig Ravnaas
craig.ravnaas@ontario.ca
(807) 468-2819 Ph.

Platinum Group Elements, Nickel and Copper Potential in the Kenora District

Platinum group element (PGE) and Ni-Cu occurrences are known to occur within ultramafic, mafic and intermediate intrusive rocks in the Kenora District. Historical exploration efforts have targeted the Ni-Cu potential but only a limited number of projects have targeted PGE mineralization. Except for advanced programs conducted at the Grassy Portage Intrusion, Entwine Lake Intrusion and the Rex-Werner Lake deposits, all other PGE exploration projects only involved prospecting and sampling. Exploration activity is presently dormant in the majority of areas with PGE-Ni-Cu potential; there could be the opportunity for option or joint venture agreements, or project generation. Several intrusions which have historically not been evaluated for their PGE potential, remain open for staking.

The following table provides a general description of the geology and mineralization of the major ultramafic, mafic and intermediate intrusive bodies in the Kenora District. The resource column indicates the most significant PGE-copper-nickel mineralization associated with the bodies. The following figure, keyed to the table, illustrates the locations of mineral potential areas.

No	AREA / NTS	STATUS Oct. 15, 2010	GEOLOGY / MINERALIZATION	RESOURCE / REFERENCES
1	Dobie Intrusion 52C/12 NW	Patent, First Nation Reserve and open Crown land	A norite - gabbro intrusion with po, py, pent, cpy mineralization. Sulphides are present in pockets or disseminations.	Young Option, 5 Mt @ 0.28% Cu and 0.24% Ni based upon 165 ddhs. (Kenora Assessment Files 52C/12 NW B-3)
2	Grassy Portage Intrusion 52C/11 NW / NE	Staked	Gabbro - anorthosite rocks in a steeply, north dipping, layered intrusion. Basal segregation of cpy, po and pent noted. The 3.7 m thick mineralized zone consists of 8% stringer and disseminated pyrrhotite and chalcopyrite at the contact between mafic volcanics and coarse grained gabbro.	North Rock Mine - 1.0M tons @ 1.17% Cu (Poulson 2000) A 3.4 m interval in diamond drill program returned 12.2 g/t Pt (Press release, MetalCORP Ltd., March 6, 2006)
3	Bad Vermilion Lake Intrusion 52C/10 NE	Staked and open Crown land	Layered mafic rocks of the intrusion are composed of equigranular medium-grained gabbro, leucogabbro and anorthosite, with disseminated magnetite and ilmenite.	Coarse-grained mineralization is located in isolated lenses within massive-textured zones of ilmenite and titaniferous magnetite. (Poulson 2000)
4	Bennett Lake intrusions 52C/16 SE / SW	Open Crown land	Gabbroic rocks that form lobate intrusions of diorite to quartz diorite.	Grab samples of altered anorthosite from Grey Trout Road exposures returned 1.46% Cu, 0.18% Ni, 0.07% Co and 46 ppb Pd (Blackburn and Hinz 1996)

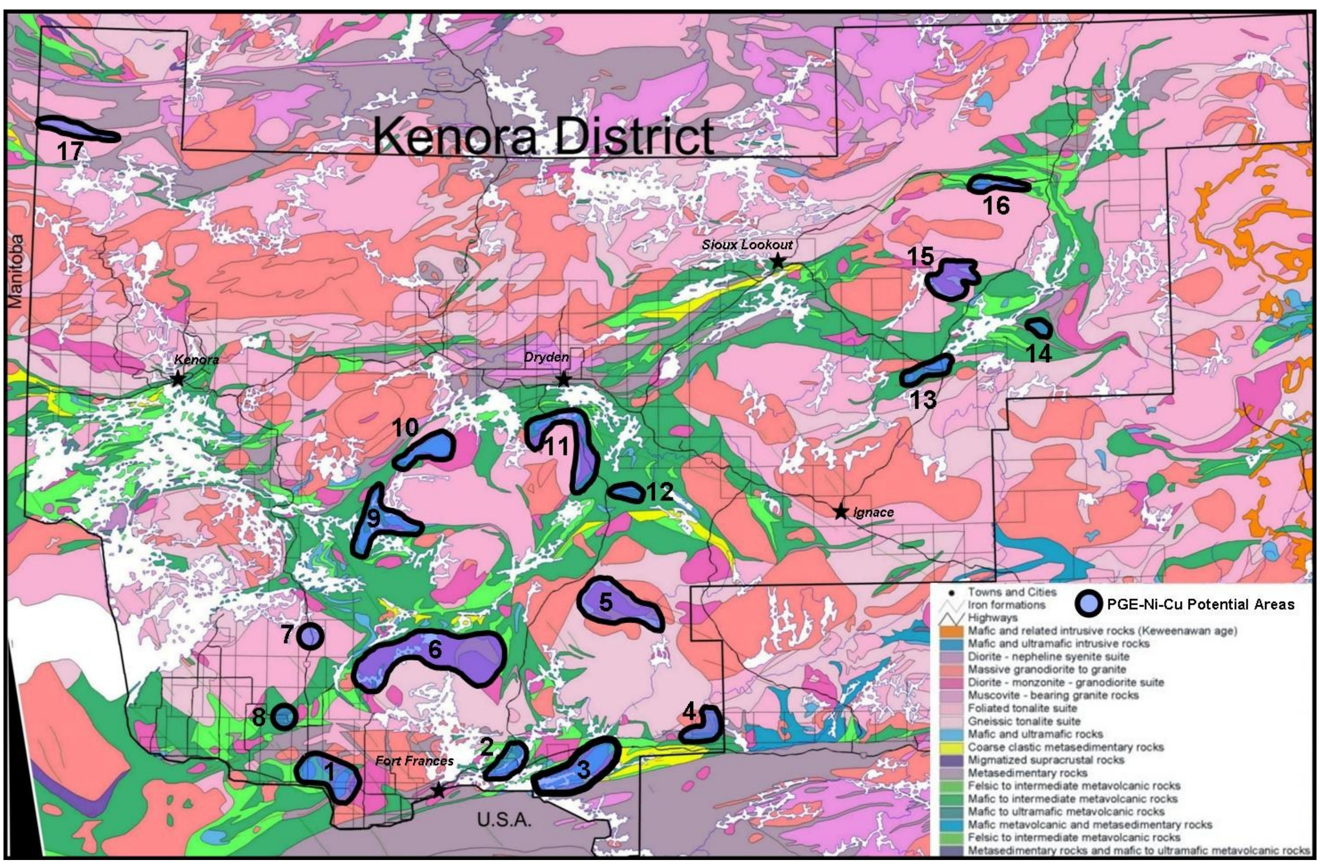
Platinum Group Elements, Nickel and Copper Potential in the Kenora District …cont'd

No	AREA / NTS	STATUS Oct. 15, 2010	GEOLOGY / MINERALIZATION	RESOURCE / REFERENCES
5	Entwine Lake Intrusion 52F/02 NE	Staked	Stone (2000) identified this intrusion as a sanukitoid suite of quartz monzonite to quartz diorite composition. Mineralization is hosted in altered diorite.	Campbell Zone has been traced for 1000 m by 45 m to a depth of 150 m. DDH ER-23 returned 1.2 g/t Au-Pd-Pt, 4.8 g/t Ag, 0.5% Cu over 30 m. (Press Releases, Champion Bear Resources Ltd. 2000)
6	Jackfish - Weller Lakes Pluton 52F/03	Open Crown land and patents	A possible sanukitoid intrusion. A porphyritic monzonite, syenite to diorite intrusive body that has received no PGE exploration (Stern 1989)	Jackfish Lake – grab sample returned 4.8% Cu, 0.96% Co. Mineralization included Cu, Co, and Bi. (Blackburn 1976)
7	Caliper Lake Intrusion 52F/04 SW	Open Crown land	Southward, steeply dipping, layered gabbroic intrusion composed of pyroxenite to quartz diorite.	5 grab samples returned 1154-2245 ppm Cr with low Cu and Ni values (<300 ppm) (Kenora Resident Geologist Office Field Work, 2000)
8	Zone #34 52D/16SE	Staked and Patents	Magmatic Ni-Cu-Co-PGE mineralization found in a sub-horizontal tabular, pyroxenite -gabbro intrusion that cuts the ODM/17 gold zone.	57 000 tonnes grading 457 ppb Pt, 1160 ppb Pd, 7562 ppm Ni, 4714 ppm Cu (Technical Report, Rainy River Resources Ltd, July 2009)
9	Denmark Lake intrusions 52F/05 NE	Staked	Variable textured gabbro with remobilized sulphides along shear zones. At Kenbridge sulphides were remobilized in a breccia pipe conduit and situated in matrix around and as filling within fragmental rocks.	Nielson – Gauthier – grab samples assayed 0.65% Cu and 0.48% Ni over 6m (Davies, 1973) Kenbridge Mine - indicated 3.7 Mt @ 0.64% Ni and 0.34% Cu. (Press release, Canadian Arrow Mines Ltd., January 2, 2008)
10	Mulcahy Intrusion 52F/11 SW	Staked, but majority open Crown land	A layered gabbro in NW border of Atikwa Batholith. The Mulcahy Intrusions can be divided into 3 marginal zones. Chromite bands containing 2% sulphides were noted.	Mulcahy Lake - grab samples returned 2190 ppm Cu and 1350 ppm Ni. (Sutcliffe and Smith, 1985) Samples from Trench 7 had 870 ppb Pd (Kenora Assessment Files 52F/11SW L1 to L-4)
11	Mafic intrusions around the Atikwa Batholith	Patents, staked and open Crown land	PGE and Cu-Ni occurrences occur within ultramafic, mafic and intermediate intrusive rocks peripheral to the Atikwa batholith. These include the Emmons Lake, Nabish, and Mile Lake intrusions.	Emmons Lake - grab samples from an altered gabbro returned 717 ppm Pt and 1012 ppm Pd. (Hinz and Ravnaas 1998)
12	Boyer Lake Intrusion 52F/07NE	Open Crown land	Strongly zoned, gabbroic sill composed of gabbro to quartz-eye gabbro. Weak sulphide mineralization has been located at the periphery.	Massval Mines - 0.2% Cu over 0.6 m and high MgO (12-15 wt%) in leucocratic zone. (Blackburn 1981)
13	Pike Lake Intrusion 52G/14 SW / SE	Staked	Composed of variable textured quartz diorite to diorite with disseminated chalcopyrite. Cu has been the target of past exploration but not PGEs.	Trench samples returned 2 % Cu and 0.5% Ni (Kenora Assessment Files 52G/14SE 0061)

Platinum Group Elements, Nickel and Copper Potential in the Kenora District …cont'd

No	AREA / NTS	STATUS Oct. 15, 2010	GEOLOGY / MINERALIZATION	RESOURCE / REFERENCES
14	Barge Lake intrusions 52G/15 NW	Open Crown land	A number of gabbro to serpentinized peridotite intrusions with disseminated chalcopyrite. There has been no exploration targeting PGE.	
15	Handcuff Lake intrusions 52J/03 NE	Open Crown land	Unexplored variable textured gabbro, anorthosite gabbro, quartz diorite intrusions.	
16	Marchington Road intrusions 52J/06 SE / SW 52J/07 SW	Open Crown land	Several mafic sills composed of diorite to quartz diorite rocks. These intrusions have not been explored for PGE.	Py and cpy noted in intrusive rocks. (Bond 1980)
17	Rex - Werner Lake Ultramafic rocks 52L/06 52L/07	Staked and Patents	Disseminated to massive magmatic Ni - Cu - Co - PGE mineralization associated with ultramafic - mafic lenses and pods. Cu - Co deposits are known in the area.	Rexora - 140 000 tons of 1.5% Ni and 0.7% Cu. Gordon Mine - produced 1.4M tons of 0.9% Ni, 0.5% Cu and 0.023 oz/t Pd Norpax – 1M tons of 1.2% Ni and 0.5% Cu (Parker 1998)

Abbreviations: cpy-chalcopyrite; pent-pentlandite; po-pyrrhotite; py-pyrite; ddhs-drillholes



Platinum Group Elements, Nickel and Copper Potential in the Kenora District …cont'd

Blackburn, C.E., Hinz, P., Storey, C.C., Kosloski, L. and Ravnaas, C.B. 1999. Report of Activities 1998, Resident Geologist Program, Red Lake Regional Resident Geologist Report: Red Lake and Kenora Districts; Ontario Geological Survey, Open File Report 5987, 88p.

Blackburn, C.E. 1976. Geology of the Off-Burditt Lake Area, District of Rainy River; Ontario Div. Mines, GR 140, 62p.

Blackburn, C.E. 1981. Geology of the Boyer Lake-Meggisi Lake Area, District of Kenora; Ontario Geological Survey Report 202, 107p.

Blackburn, C.E., and Hinz, P. 1996. Kenora Resident Geologist's District; in Report of Activities 1996, Ontario Geological Survey, Open File Report 5958, 465p.

Bond, W.D. 1980. Geology of the Houghton-Hough Lakes Area (Savant Lake Area), District of Thunder Bay; Ontario Geological Survey Report 195, 112p.

Davies, J.C. 1973. Geology of the Atikwa Lake Area, District of Kenora; Ontario Div. Mines, GR 111, 57p.

Hinz, P., and Ravnaas, C. 1998. Kenora Resident Geologist's District; in Report of Activities 1999, Ontario Geological Survey, Open File Report 5987, 31p.

Ontario Geological Survey 2003. 1:250 000 scale bedrock geology of Ontario; Ontario Geological Survey, Miscellaneous Release—Data 126.

Poulson, K.H. 2000. Geological setting of mineralization in the Mine Centre-Fort Frances area; Ontario Geological Survey, Mineral Deposits Circular 29, 78p.

Sutcliffe, R.H., and Smith, A.R. 1985. Precambrian Geology of the Mulcahy Gabbro, District of Kenora; Ontario Geological Survey, Map P.2826, Geological Series, Preliminary Map, scale 1: 15 840, Geology 1984.

HIGHLIGHTS

- **Rare metal pegmatites have been explored in two areas**
- **A historic (not 43-101 compliant) Li_2O resource has been reported from the Consolidated Morrison Pegmatite**
- **Elevated rare metal assay values have been reported from the Pakeagama Lake pegmatite**

Contact:
Carmen Storey
carmen.storey@ontario.ca
(807) 727-3272 Ph.

Rare Metal Pegmatite Bodies in the Red Lake District

The rare metal pegmatite fields between Pakwash Lake and Lake St. Joseph at the northern boundary of the English River Subprovince have received little attention. Lithium minerals have been found at three of these pegmatites, lithium anomalies are reported from others, and one of the pegmatites in the Root Lake area is known to contain tantalum. Historic exploration work on the McCombe pegmatite identified a Li2O resource of 2.3 million tons of 1.3% Li2O in 1955 (not 43-101 compliant). Work by the Red Lake Resident Geologist office and the OGS (Breaks et al. 2003, Storey et al. 2000) has indicated several areas in this zone that warrant exploration, in particular the mafic metavolcanic rocks along the Roadhouse River north of the Lake St. Joseph Fault just north of Root Lake (NTS 52J/13NE)

Work by Fred Breaks of the OGS (Breaks et al. 1999) and Houston Lake Mining Inc. has indicated significant potential for Rare Element Pegmatites at Pakeagama Lake in the Bearhead Fault zone. The 140km long zone, approximately 170km north of Red Lake, separates the Berens River and Sachigo Subprovinces of the Canadian Shield. Assay results for 24 samples released by Houston Lake Mining returned an average value of 280 g/t (0.028 percent) tantalum oxide, 4642 g/t rubidium oxide, 817 g/t cesium oxide, 366.4 g/t beryllium oxide, and 124 g/t tin. The entire length of the Bearhead Fault zone warrants exploration for rare metal pegmatites, in particular the area to the northwest and southeast of the Pakeagama Lake pegmatite, and the area south and west of Setting Net Lake (see Map P.3220, NTS 53C/12 NE and Map P.3226, NTS 53C/13 SE).

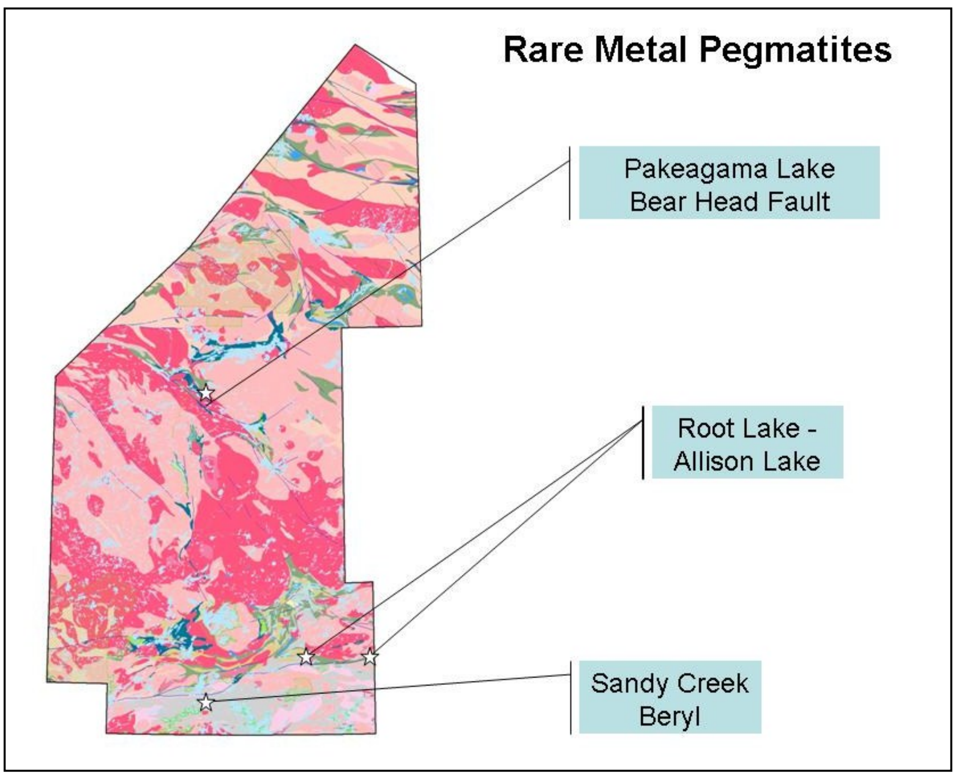


Figure 16. Location map showing rare metal pegmatite occurrences in the Red Lake District

Rare Metal Pegmatite Bodies in the Red Lake District …cont'd

Breaks, F.W., Tindle, A.G. and Smith, S.R. 1999. The Pakeagama Lake Pegmatite: Continued field and laboratory investigations of highly evolved, complex-type, petalite-subtype rare-element mineralization in the Berens River – Sachigo Subprovince Boundary; *in* Summary of Field Work and Other Activities 1999, Ontario Geological Survey Open File Report 6000 p 26-1 to 26-12.

Breaks, F.W., Selway, J.B. and Tindle, A.G. 2003. Fertile peraluminous granites and related rare-element mineralization in pegmatites, Superior Province, northwest and northeast Ontario: Operation Treasure Hunt; Ontario Geological Survey, Open File Report 6099, 179p.

Storey, C.C., Hinz, P., Gosselin, S.DM., Blackburn, C.E., and Kosloski, L. 2000. Report of Activities 1999, Resident Geologist Program, Red Lake Regional Resident Geologist Report: Red Lake and Kenora Districts; Ontario Geological Survey, Open File Report 6003, 63p.

HIGHLIGHTS

- **Potential of Roberto-style, subprovince boundary associated gold mineralization**
- **Known, high-grade gold occurrences associated with highly altered tuffs and sediments near a quartz diorite intrusion**
- **Considerable open ground**

Contact:
Andreas Lichtblau
andreas.lichtblau@ontario.ca
(807) 727-3272 Ph.

Potential Roberto-style Gold Mineralization, Red Lake District

Gold occurrences have been documented along portions of the **Lake St. Joseph-Sydney Lake Fault** that are within a few kilometres of the Papaonga Lake quartz-diorite stock, 100 km east of Red Lake. The fault represents the subprovince boundary between the Uchi metavolcanic terrane to the north, and the English River metasedimentary gneisses to the south. At least six gold showings are known between Curie and Papaonga lakes; they are hosted by sheared, silicified, sericitized ± tourmalinized tuffs and sedimentary rocks, which are cut by quartz-tourmaline-arsenopyrite veins. At the PL-1a zone of the Papaonga Lake occurrence (MDI#52K16NW00005), sulphide-bearing, graphitic wacke hosts a 1.7 km long zone of contorted, quartz-tourmaline veining. Channel samples as high as 0.33 ounce gold per ton over 0.5 m were reported from the North Showing of the Curie Lake occurrence (MDI#52K16NE00003) during the last exploration work performed in mid-1980's.

Gold mineralization in the Curie and Papaonga lakes area has certain similarities with multi-million ounce **Roberto-style** gold mineralization, being actively explored at Goldcorp Canada Ltd.'s Eleonore property in Québec. Similarities include: 1) the regional association of gold mineralization with a quartz diorite stock, adjacent to a subprovince boundary; 2) the polydeformed nature of host sedimentary rocks and tuffs; and 3) the association of gold with tourmaline-arsenopyrite-sulphide veins and disseminated sulphides.

Recent staking of >56 000 h approximately 55 km to the west of Papaonga Lake points to the gold potential of the area straddling the subprovince boundary. Laurentian Goldfields Ltd.'s surveys on its Goldpines property discovered a 200 km^2 Au-As-Sb hydrogeochemical anomaly centred on Pakwash Lake, in the Dixie Lake and Cabin Bay map areas. Airborne and ground surveys in 2010 have followed-up and detailed the anomalous area.

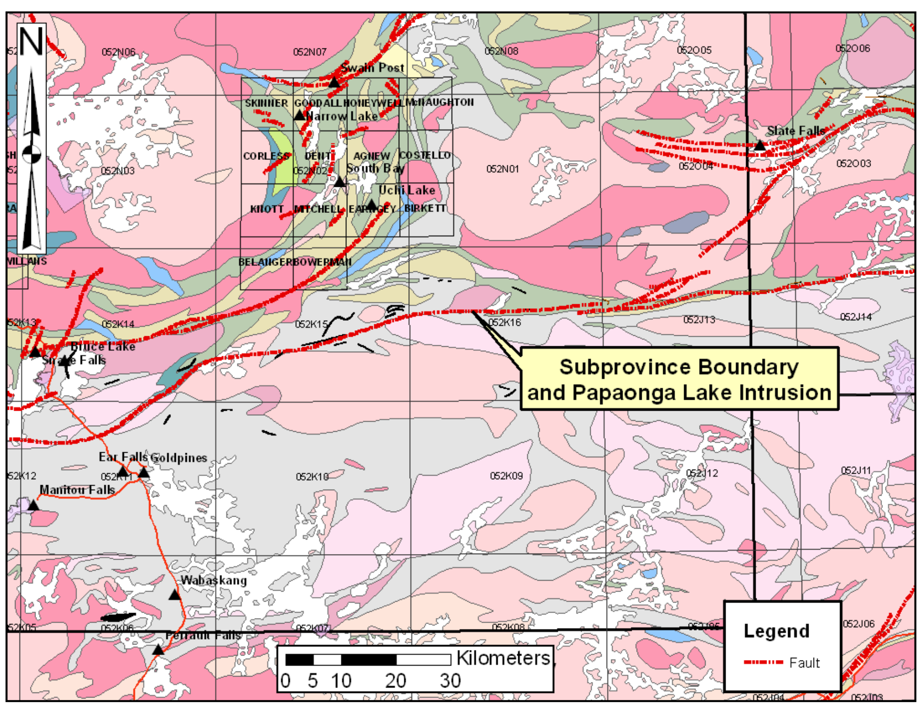


Figure 17. Location map of Uchi-English River subprovince boundary

HIGHLIGHTS

- **Gold occurs along folded lithologic contacts between units of contrasting competency or ductility in the Black Lake area**
- **Gold occurs along shear zones that are developed along or intersecting lithologic contacts particularly near the Alcona mine**
- **Areas of strong alteration are priority exploration targets**

Contact:
David Lewis
david.lewis4@ontario.ca
(705) 670-5727 Ph.

Gold Mineralization in the Split Lake Area

Interest in the Split Lake area, located approximately 25 km east of Sioux Lookout, Ontario, has historically focussed on gold mineralization. Observations and interpretations based on recent OGS detailed mapping (Lewis 2010) have implications for gold exploration in the area and perhaps more regionally.

Gold mineralization in the Split Lake area occurs primarily in two types of settings. The first of these, exemplified by the Black Lake area in the northwest part of the belt, is in association with mafic-felsic volcanic contacts, particularly in areas where the contact is folded and competency contrasts between rock units resulted in the fracturing and alteration of the felsic rocks. The second setting, exemplified by the historic Alcona mine, is at the intersection of east-trending dextral faults and lithologic contacts. In both cases, mineralization is associated with conspicuous quartz-carbonate (+/-sericite +/-green mica) alteration.

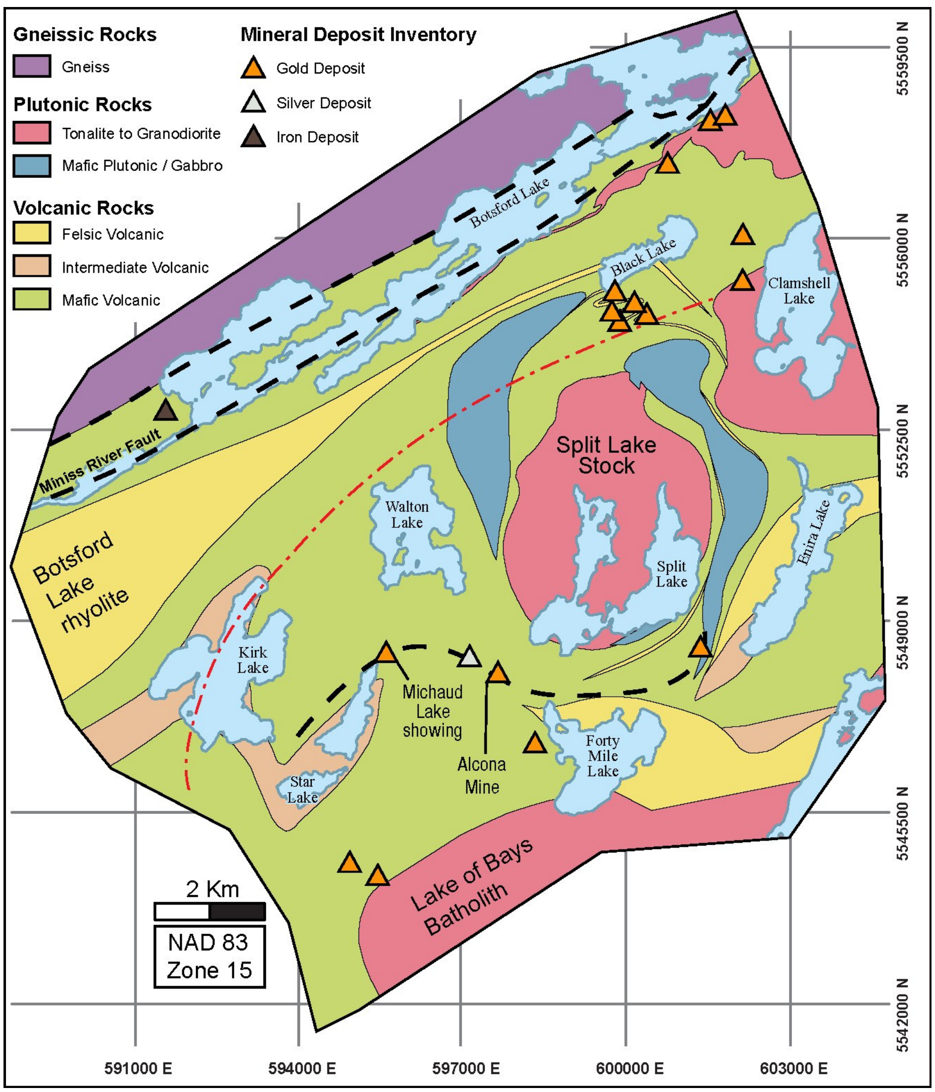


Figure 18. Geological map of the Split Lake area. The black dashed lines represent faults and the red dashed lines represent the axial traces of folds.

Gold Mineralization in the Split Lake Area …cont'd

The foregoing suggests that exploration should target areas where folding generates deviations from the general regional trend of stratigraphy and second order structures within regional fault systems. Areas where these structures coincide with lithologic contacts and quartz-carbonate alteration are especially prospective. Although these concepts are based on observations in the Split Lake area, they may be more generally applicable to the entire Sioux Lookout greenstone belt.

Lewis, D. 2010. Geology of the Split Lake Area, Western Wabigoon Subprovince, Northwestern Ontario; *in* Summary of Field Work and Other Activities 2010, Ontario Geological Survey, Open File Report 6260, p.15-1 to 15-10.

HIGHLIGHTS

- **Au potential around Keezhik Lake**
- **Au potential and hydrothermal alteration in the Talbot Lake area**

Contact:
Sara Buse
sara.buse@ontario.ca
(705) 670-3010 Ph.

Recommendations for Exploration in the Keezhik Lake Area, Fort Hope Greenstone Belt, Northwestern Ontario

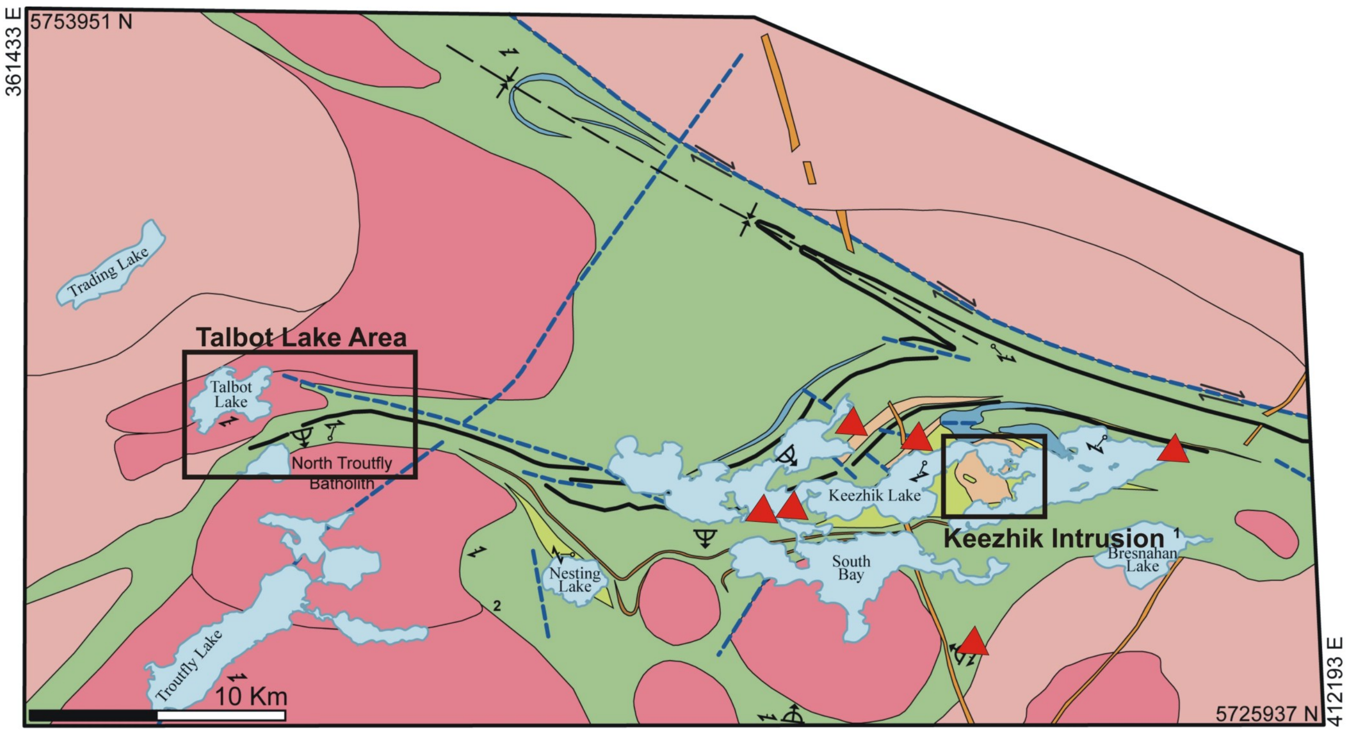
The Keezhik Lake area, located in the northwestern portion of the Fort Hope greenstone belt in the eastern Uchi Domain has historically been under-explored due to its remoteness and the lack of outcrop. Several mineral occurrences are recorded within the Keezhik Lake area, but, due to poor outcrop exposure, the majority of these are from diamond-drill holes (for a summary of these up to 1995, see Mason and White 1995). There are three main prospects for exploration within the Keezhik Lake area, two of which are found in the vicinity of Keezhik Lake and the third is found in the vicinity of Talbot Lake.

The first type of alteration and mineralization in the vicinity of Keezhik Lake is associated with the synvolcanic Keezhik intrusion on the eastern arm of the lake. It exhibits sericite and ankerite alteration as well as local quartz veining. The sericite alteration is typically fine grained and anhedral and occurs irregularly throughout the pluton along foliation planes, ranging in amount from 2 to 10%. The ankerite alteration is a fine-grained patchy alteration found in some areas of the pluton. Locally in the altered zones, pyrite occurs from 1 to 5% and is generally euhedral and disseminated. Local fine-grained chalcopyrite was observed in 2 locations in the pluton. Small local shear zones with unknown displacement sense are located in many of the altered outcrops in the area and often have associated sericite alteration. Quartz veins ranging from 5 to 40 cm thick are found in consistent orientations in several of these outcrops, but do not appear to carry sulphide minerals.

The second type of alteration, quartz-ankerite veining, is found sporadically in outcrops in the vicinity of Keezhik Lake. The quartz-ankerite veins typically occur in small localized shear zones, where they are found along the shear plane. They are dominated by ankerite with 4 to 6 mm wide extensional quartz veins that are oriented perpendicular to the orientation of the shear. There is not one particular orientation of shear that contains these types of veins. One vein west of the north arm on Keezhik Lake contained 3% disseminated, fine-grained pyrite and chalcopyrite. Other veins of this type are barren or they contain 1 to 4% disseminated fine-grained pyrite.

The third prospective area within the Keezhik Lake area is in the vicinity of Talbot Lake which has a gold mineral occurrence, held by Abbastar Resources, associated with a large west-trending quartz vein containing pyrite, chalcopyrite, sphalerite and visible gold. This area also shows pervasive quartz-epidote-garnet alteration that has been interpreted to be synvolcanic by crosscutting relationships between syntectonic granitoid rocks and the altered pillow basalts. This type of alteration occurs as fine-grained pods of epidote and quartz in pillow basalts, both within the core of the pillows and in the selvages, as well as within massive flows. The epidote alteration is very patchy and ranges in size up to 30 cm in width. Locally, associated with the epidote-altered metavolcanic rocks, 1 to 3% fine-grained, disseminated pyrite was observed. Subhedral, 2 to 4 mm size garnets were observed around some pillow selvages in the area. This type of alteration is typically associated with hydrothermal volcanogenic massive sulphide environments.

Recommendations for Exploration in the Keezhik Lake Area, Fort Hope Greenstone Belt, Northwestern Ontario …cont'd



▲ **Location of select Quartz-Ankerite Veins**

Buse, S. and Purdy, C. 2010. Preliminary Results from the Eastern Uchi Bedrock Mapping Project in the Keezhik Lake Area, Fort Hope Greenstone Belt, Uchi Subprovince. In: Summary of Fieldwork and Other Activities 2010, Ontario Geological Survey, Open File Report 6260, p.18-1 to 18-13.

Mason, J.K. and White, G.D. 1995. Mineral occurrences and prospects in the Fort Hope–Winisk area; Ontario Geological Survey, Open File Report 5926, 225p.